URBAN DWELLING ENVIRONMENTS: CALI, COLOMBIA

CASE STUDIES, URBAN DEVELOPMENT MODEL

BY

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Case Studies
Urban Development Model

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In addition, I am grateful to: Mr. Enrique Cucalon, Director of I.C.T.; Ana de Puente, Luis Collazos, Stella Paredes and the Municipal Planning Office of Cali.

Last, but by no means least, I wish to express my thanks to my wife, Bertha Lucia, for her moral support.

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ABSTRACT

URBAN DWELLING ENVIRONMENTS: CALI, COLOMBIA
by JAIRO A. MILLAN V.
Submitted to the Department of Architecture on May 9, 1975 in partial fulfillment of the requirements for the degree of "Master of Architecture in Advanced Studies".

This research on low income dwelling environments intends to describe and evaluate the existing housing situation in the city of Cali, Colombia. National authorities recognize the serious nature of the problem and this document is intended as a reference for their use. This report is the result of studies based on observation and surveys carried out by the author, plus the documents supplied by the public and private authorities dealing with housing problems. The case study analysis is based on a procedure developed in the Urban Settlement Design Program, MIT, directed by Professor Horacio Caminos.

This study focuses on four selected situations existing at the present time in Cali's metropolitan area. The following are included: an introduction to Cali's housing system; a brief summary of "National Context"; a description of the city's "Urban Context"; four case studies which represent more or less the low income housing situation (one of these cases represents a government project). Each case is summarily described in similar terms: DRAWINGS (locality plans, locality segment, locality land use, locality circulation, dwelling plans, dwelling elevation, and dwelling section); DESCRIPTIVE DATA (socio-economic and physical); PHOTOGRAPHS (aerial and dwellings). Also included are: dwellings and land evaluation, physical aspects, utilities and services, land utilization and layout efficiency of the cases presented. In terms of application, this study provides: a) a reference for the understanding of low income housing and its urban environments; b) a reference for the identification of dwelling subsystems in any urban context; and c) a reference for planning realistic low income housing solutions. It also will help to set determinants for discussion/evaluation/ policy decision-making.

Relatively few people actually have no shelter of any kind in Cali, but a far greater number live in substandard housing with inadequate services and construction. Society must contribute to the improvement of this situation. In order to facilitate discussion and evaluation, a model project is presented. This proposal stresses optimum efficiency of residential land utilization. The project considers alternative housing options for very low, low and middle low income groups: expandable dwelling units, walk-up apartments, lots, and site and services programs.

Thesis supervisor: Horacio Caminos
Title: Professor of Architecture

INTRODUCTION

In Cali, as well as in the rest of Latin American cities, population growth, the increase in the deficit of dwelling units, the decline of dwelling environments, and the rapidly increasing rural-to-urban migration are major social and economic problems. It is common knowledge that all these conditions, which affect the urban environment, have their strongest affect on low income sectors; representing approximately 70% of the total population in Cali. The city is not prepared to absorb even the natural population growth moreover the migration from the rural areas. Accelerated population growth of the city has caused a very serious shortage in urban facilities and services because of the great demand. The people are left to find solutions by themselves and settle on lands not yet developed.

The surveys carried out in this study have been prepared in order to offer a more realistic comprehension of the relationship between people and their dwellings in the context of rapid social change in the city of Cali. Four localities are analyzed along with basic data on population characteristics corresponding to the physical form described at the time of the survey. The studies are presented in sections as follows:
URBAN CONTEXT: introductory material describing the urban area within which the case studies were surveyed.
CASE STUDIES: sections containing the dwelling/land systems or housing situations surveyed. The four cases selected include the whole spectrum of the low income sectors.
EVALUATIONS: section containing evaluations of case studies which are compared with respect to specific aspects.
PHYSICAL DATA MATRIX: section allowing a comprehensive over-view and cross-comparison of information from all the cases.
COMMUNITY DATA MATRIX: comparative summary of the dwelling indicators related to the environments.
LAND UTILIZATION: patterns/percentages/densities; graphic method of showing land subdivision patterns, land utilization percentages, and densities.
LAND UTILIZATION: optimum ranges and layout efficiency; graphs and summaries of land utilization percentages values are cross-compared to indicate acceptable localities from a match of the two variables. Optimum range has been established based on previous experiences in developing countries requiring relatively high densities and economic urban land development practices.

URBAN DEVELOPMENT MODEL: a proposed model of basic land subdivision is developed using the case studies as a basis for design. The design is focused on the efficiency of the physical layout: circulation lines, lot areas, semi-public and public spaces.

COLOMBIA
National Context

Colombia is located in the northwest corner of South America. With an area of 455,355 sqaure miles, it is the fourth largest country on the continent--about as large as Texas, Oklahoma, and New Mexico combined. Colombia has a coastline of more than 900 miles on the Pacific Ocean and 1,100 miles on the Carribean Sea. Its location close to the Panama Canal and bordering Venezuela, Brazil, Peru, Ecuador, and Panama, has given it special importance.

The Andes Mountains enter Colombia in the southwest and fan out into three distinct ranges which run through the country from southwest to north and northeast. There are three main topographical regions: (1) the flat coastal areas broken by the high Sierra Nevada de Santa Marta mountain range; (2) the central highlands; and (3) the sparsely settled eastern plains (the llanos) drained by the tributaries of the Orinoco and Amazon Rivers.

Climate is determined largely by altitude, varying from tropical heat on the coast and the eastern plains to cool, springlike weather with frequent light rains in the highland. There are generally two dry seasons in the highlands--from December to February and from June to August. Bogota is situated 8,630 feet above sea level. Average daily high temperature is between 64 and 68 F.; its low ranges between 48 and 51 F.
The top half of Colombia's flag is yellow; the bottom half consists of a blue stripe and a red stripe of equal widths.

2. POPULATION

Colombia is the fourth most populous nation in Latin America, after Brazil, Mexico, and Argentina. At current growth rates (average 3.4 percent annually since 1951) population will surpass Argentina's within a few years. Overall density is 52 persons per square mile. However, the eight eastern Departments and Territories, with 54 percent of Colombia's area, have less than 3 percent of the population at a density of two persons per square mile.

As a consequence of the rapid population increase, the median age shown by the 1964 census was only 16.7 years, lowest in South America. The large proportion of dependent young people burdens Colombia's educational and health facilities. Moreover, movement from rural to urban areas has been heavy, and the trend continues. Persons living in places of 1,500 or more inhabitants increased from 29 percent of the total population in 1938 to about 60 percent in 1970. It is estimated that 40 percent of the Colombian population now lives in the 19 cities of 100,000 or more inhabitants. The largest are Bogota (2.8 million), Medellin (1.6 million), Cali (1.1 million), and Barranquilla (751,000). At present growth rates, by 1975 there will be at least 23 cities with populations of more than 100,000 people.

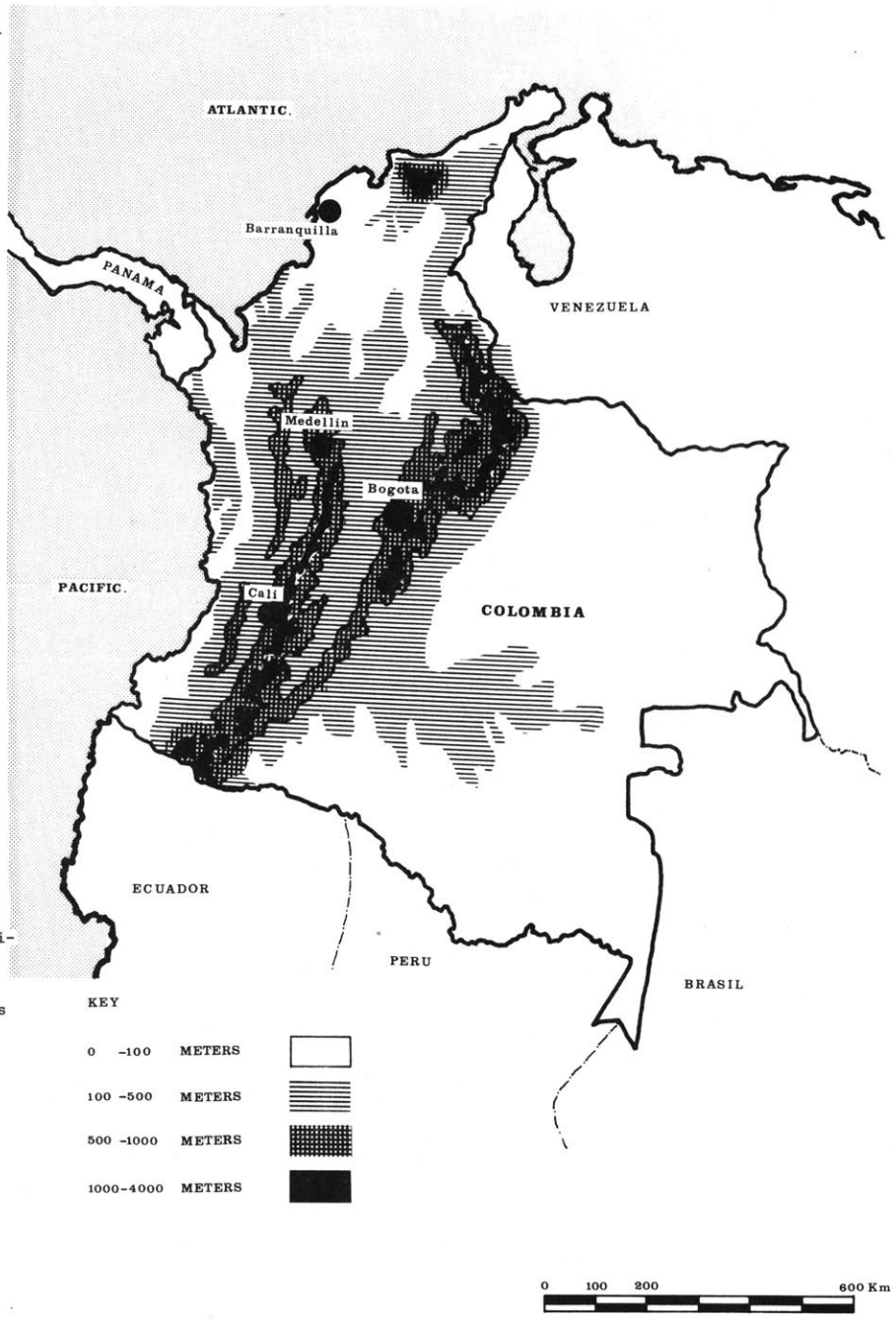
3. HISTORY

In 1549 the area now known as Colombia was established as a Spanish colony, with the capital at Bogota. In 1717 Bogota became the capital of the Viceroyalty of New Granada, which included what is today Venezuela, Ecuador, and Panama. Thus the city became one of the principal administrative centers of the Spanish possessions in the New World, along with Lima and Mexico City. On July 20, 1810, the citizens of Bogota created the first representative council in defiance of Spanish authority. Total independence was proclaimed in 1813, and in 1819 the Republic of Greater Colombia was formed.

After defeat of the Spanish army, the Republic included all the territory of the former Viceroyalty. Simon BOLIVAR was elected first President and Francisco de Paula SANTANDER, Vice President of Greater Colombia. In 1822 the United States became one of the first countries to recognize the new Republic and to establish a resident diplomatic mission. In 1830 Ecuador and Venezuela withdrew from the Republic and became independent states. Panama remained part of Colombia until 1903.

4. GOVERNMENT

Colombia's present Constitution was adopted in 1886 but has been amended frequently and substantially. It guarantees freedom of religion, speech, assembly, and other basic rights. The National Government is composed



of separate executive, legislative, and judicial branches. The President (Chief of State and Head of Government) is elected for a 4-year term and may not serve consecutive terms. The powers which he may legally exercise are very extensive. These include the power to appoint Cabinet Ministers and departmental and territorial Governors without congressional confirmation.

There is no Vice President as such. Every 2 years Congress elects a "designate" of the same political affiliation as the President who becomes Acting President in the event of the President's absence from the country, ill health, death, or resignation. If the President's inability to serve is permanent, the Acting President must call new elections within 3 months. The designate has no duties and receives no salary; he may hold other public or private positions at the same time he serves as designate. If Congress fails to elect a designate, the Foreign Minister becomes Acting President should the President be unable to serve.

Colombia's bicameral Congress consists of a Senate with 118 members and a Chamber of Representatives with 210 members, all elected on a basis of proportional representation and appotioned according to population. Congressional members are elected at the same time as the President but may be reelected indefinitely. Should a member of Congress be absent temporarily or permanently, his seat is taken by an alternate who is elected the same time as the member. Congress meets annually from July 20 through December 16, and the President may call it into special session at other times.

All Colombian citizens who are at least 21 years old and who are not members of the armed forces or police or serving a prison sentence are eligible to vote. Voting is not mandatory.

Judicial power is exercised by a Supreme Court of Justice and subordinate courts. Half of the justices of the Supreme Court are elected by the Senate and half by the Chamber of Representatives from lists submitted by the President. The justices serve 5-year terms and may be reelected indefinitely. Lower court judges are elected by the Supreme Court.

The country is divided into 22 Departments, the Special District of Bogota, four intendencias, and four comisarias (territories of lesser rank not having local legislatures). Governors and mayors, who are appointed by the President, are considered agents of the National Government, although their powers are somewhat limited by the elected departmental legislatures and city councils. The latter two bodies are elected to 2-year terms.

5. ECONOMY

Colombia's gross national product (GNP) in 1972 was estimated at $7.4 billion. Average annual increase in real terms in 1967-71 was 5.9 percent, compared to 4.6 percent in 1963-66 and 5.4 percent in 1959-62. Per capita GNP is estimated at $324 in 1972. Annual per capita increase in real GNP averaged 1.3 percent during 1962-67 and 2.9 percent in 1968-72.

Colombia is, after Brazil, the world's second largest producer and exporter of coffee, a mild, rich product which is regarded as one of the world's best coffees and normally receives a premium price on the world market. Colombia sells about 40 percent of its coffee to the United States, and the United States buys about 12 percent of its coffee from Colombia.

Because of Colombia's dependence on coffee exports, a change of 1¢ a pound in the world market price means a gain or loss of more than $8 million a year to Colombia--an increase or decrease of more than 1 percent in its total annual earnings of foreign exchange. Since the price of a pound of coffee has fluctuated as much as 15 cents in a single recent year, Colombia's export earning are highly vulnerable to conditions in the coffee market. For this reason Colombia is a party to and a strong supporter of the International Coffee Agreement, signed in September 1962, which has sought to modify price fluctuations.

In 1971 raw coffee contributed an estimated 55 percent to the value of Colombia's exports, crude oil 7 percent, and other exports 38 percent. Export diversification to reduce the dependence on coffee is one of Colombia's principal policy objectives. From 1969 to 1971, exchange receipts from exports other than coffee and oil grew at a 25 percent average annual rate. Exports of coffee and petroleum were valued at $428 million and $56 million respectively in 1971; all other exports amounted to $298 million. Chief among these were live animals and beef ($44 million), textiles ($36 million), cotton ($35 million), and sugar ($27 million). In 1971 the United States took approximately 36 percent of Colombia's exports, the Federal Republic of Germany 14 percent, the Latin America Free Trade Area (LAFTA) 7 percent, Spain 5 percent, and the Netherlands 5 percent.

Principal imports in 1969-70 were machinery and electrical equipment (28 percent), aircraft, transport vehicles and equipment (18 percent), metal and metal products (12 percent), and chemical products (8 percent). Forty-six percent of all imports came from the United States, 9 percent from the Federal Republic of Germany, 9 percent from the LAFTA countries, 6 percent from Japan, 6 percent from Spain, and 4 percent from the United Kingdom. Total imports in 1971 were an estimated $880 million.

Agriculture and Industry

The economy is still predominantly agricultural, although manufacturing has increased in importance with the strong encouragement and support of the National Government.

Agriculture contributed 37 percent of the gross domestic product (GDP) in 1955 and an estimated 27 percent in 1970. Manufacturing increased in the same period from 15 to 18 percent. Other sectors have undergone little change--in 1969 trade contributed 20 percent; government and services 20 percent; transportation, communications, and public utilites 8 percent; construction 5 percent; and mining 2 percent. Agriculture, forestry, and fishing employed an estimated 45 percent of all wage-earners in 1970, manufacturing 14 percent, and trade and finance 11 percent. The most important industries are food, beverages, tobacco, textiles, chemicals, metal products, and machinery. Electric power production increased almost 45 percent between 1966-1970.

Foreign investment in Colombia at the end of 1971 was estimated at about $1 billion, of which some 75 percent came from the United States. About half the U.S. investment was in petroleum; the major U.S. investors are Texaco, Gulf, Standard Oil of New Jersey, Cities Service, and Mobil. Taxes and royalties paid by the U.S. and other foreign oil companies account for between 3 and 4 percent of the Colombian Government's domestic revenues.

Another major investment of over $100 million is scheduled to be made by Hanna Mining Company and Standard Oil of California, each of which will contribute one-third of the cost of development of the Cerro Matoso ferronickel deposits in Cordoba Department. The Colombian Government's Institute for Industrial Development will contribute the remaining one-third. When in full operation, the plant is expected to add about $50 million worth of nickel a year to Colombia's exports.

The outlook for foreign investment has been complicated by Colombia's adherence to the Andean Pact's Code of Foreign Investment. If fully implemented in Colombia the code would regulate the transfer of technology, the gradual and progressive sale of shares to Colombian investors, and limit remittance levels of net profits to 14 percent annually. The code incorporates a number of provisions for exceptions, however, and as of November 1972, the regulations that will govern Colombia's participation had not been fully determined.

The international lending agencies have been important sources of aid for Colombia. Beginning with fiscal year 1969 the International Bank for Reconstruction and Development (IBRD) replaced the U.S. Agency for International Development (AID) as the largest single lender to Colombia. The IBRD is chairman of the Consultative Group on Colombia, an organization of five international agencies, 10 West European countries, Japan, Canada, the United States, and Colombia itself, which meets regularly to consult on the members' aid programs and the progress being made by Colombia. Loans extended in FY 1962-71 totaled $661.5 million from the IBRD, $396.8 million from the Inter-American Development Bank (IDB), $19.5 million from the International Development Association (IDA), $13.6 million from the International Finance Corporation (IFC). Grants from the United Nations amounted to $30.5 million. Loans from foreign governments, other than the United States, average about $20 million a year.

CALI, COLOMBIA

URBAN CONTEXT

1) PRIMARY INFORMATION: The city of Cali is located in a fertile and irrigated plain between two mountain ranges of the Andes, at an altitude corresponding generally to a tropical climate. Throughout the entire year, the city enjoys a temperature not higher than 25 C. and a relatively dry and pleasant atmosphere because it is 1003 meters above sea level and it receives sea breezes from the Pacific Ocean.

The city is bounded to the north by the municipality of Yumbo; to the south by the "Acienda Canas Gordas" and agricultural land; to the east by the Cerro Cristo Rey and the Three Crosses Hill; and to the west by the Cauca River, the second largest river in Colombia.

2) HISTORY: The city of Cali was founded by Sebastian de Belalcazar in 1936. During the conquest, Cali was a stop-over for the conquerors when they traveled between Quito, La Plata, and Sante Fe. At that time, Cali was important because it was agriculturally rich and provided important supplies for the conquerors.

Between 1536 and 1940 Cali was a peaceful town, semi-pastoral and semi-artisan, but at the beginning of 1940, Cali experienced sudden demographic, cultural, industrial, and commercial growth that transformed the town into a city, and at the same time caused serious problems relative to every macro development.

3) ECONOMY: Cali, one of the oldest cities in Colombia, is the capital of the principal sugar-producing region of the country. In economic activity, industry assumes a greater importance than agriculture. It represents 38% of the total state productivity. In 1960, the annual per capita income of the metropolitan area was estimated at $US 600. This figure represents 84% of the total population of the city. Cali contributes 14.1% of the total national income.

4) GOVERNMENT: Valle is one of the 22 states that make up the Republic of Colombia. The highest authority in Cali, the capital, is the mayor. He is elected by the Governor of the State who is, in turn, named by the President of the Republic, who is, in turn, elected by the citizens by means of popular election.

The municipal government system consists of a Municipal Council which is a cabinet of popular representatives. The council facilitates the budget of income and expenditures, determines the standards and rules of municipal administration, and executes urban policies and regulations.

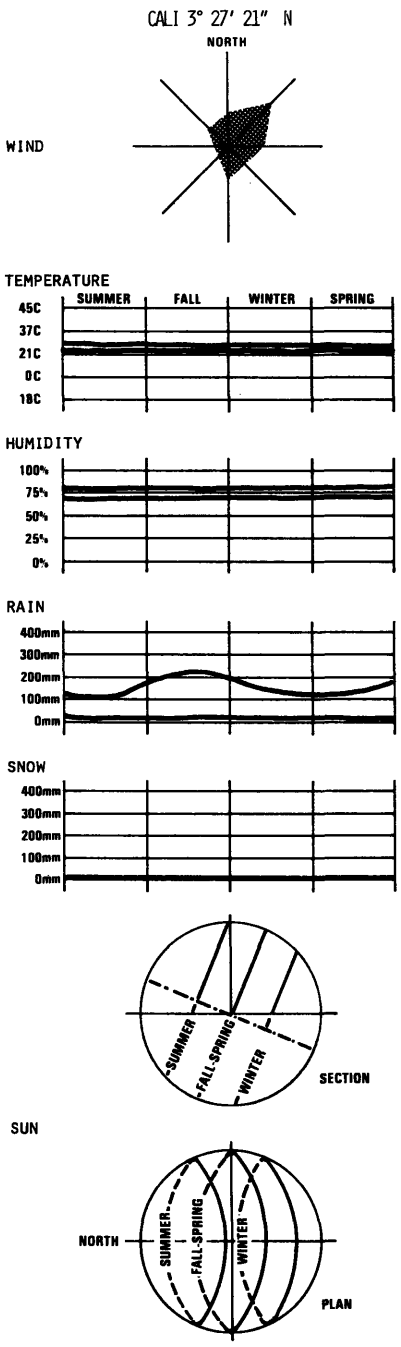
5) DEMOGRAPHY: The estimated population of Cali in 1964 was 638,211 inhabitants, a 3.9% average annual increase each year from 1951. In 1974, the population of Cali was 1,085,300 inhabitants. With an average age of 23, this population is young. Of the total population, 27.6% was born in the city; 52.4% was born in the provinces and abroad. The population in 1969 shows an active population of 33% and an inactive population of 67%. The projected population for the year 2000 is approximately 3.6million.

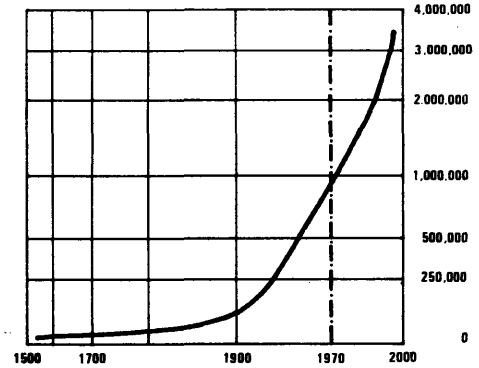
6) SOCIO-CULTURAL: In Cali, all types and subtypes of people from Colombia and the rest of the world mix and live together. Within one generation, cultural, economic, and social conditions have changed as a result of the "fortunate experiment" a new tropical population has come about.
The annual household incomes are distributed in the city of Cali as follows: $240 US for 25%; $480 US for 32%; $960 US for 27%; and $960 + for 16%.

7) SOCIO-ECONOMIC: The low income sector is concentrated in the outskirts of the city: to the south Siloe and Melendez; to the east the barrio which is like Union de Vivienda Popular called Nororientales; and to the west Terron-Colorado. These sectors represent approximately 27% of the population and they are comprised of migrants from rural areas. Upper income sectors are concentrated in one of the oldest urban areas known as Traditional which is near the central business district. The high income sectors are located mainly on the north and south sides of the city and they consist of approximately 20% of the population.

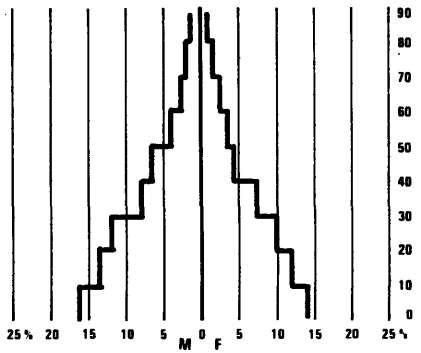
8) HOUSING: The land values in the city range from $40 US to $120 US per square meter for the most expensive and from $40 US to $3 US per square meter for the least expensive. The minimum allowed area per lot is 120 m^2
In Cali, According to an income survey done in 1969, 60% of the population owns the house in which they live and 40% rent them.
At the beginning of 1969, the city presented a deficit of 70,500 dwelling units.

According to the general plan of development, it estimated an annual residential development of 72 hectares from 1970 to 1985-2000.

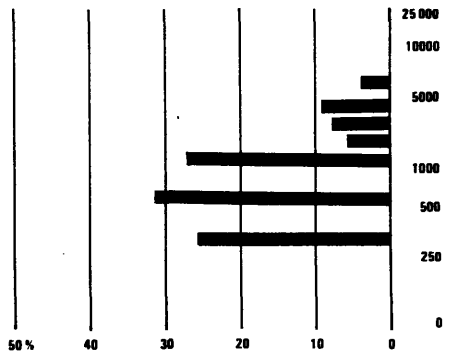




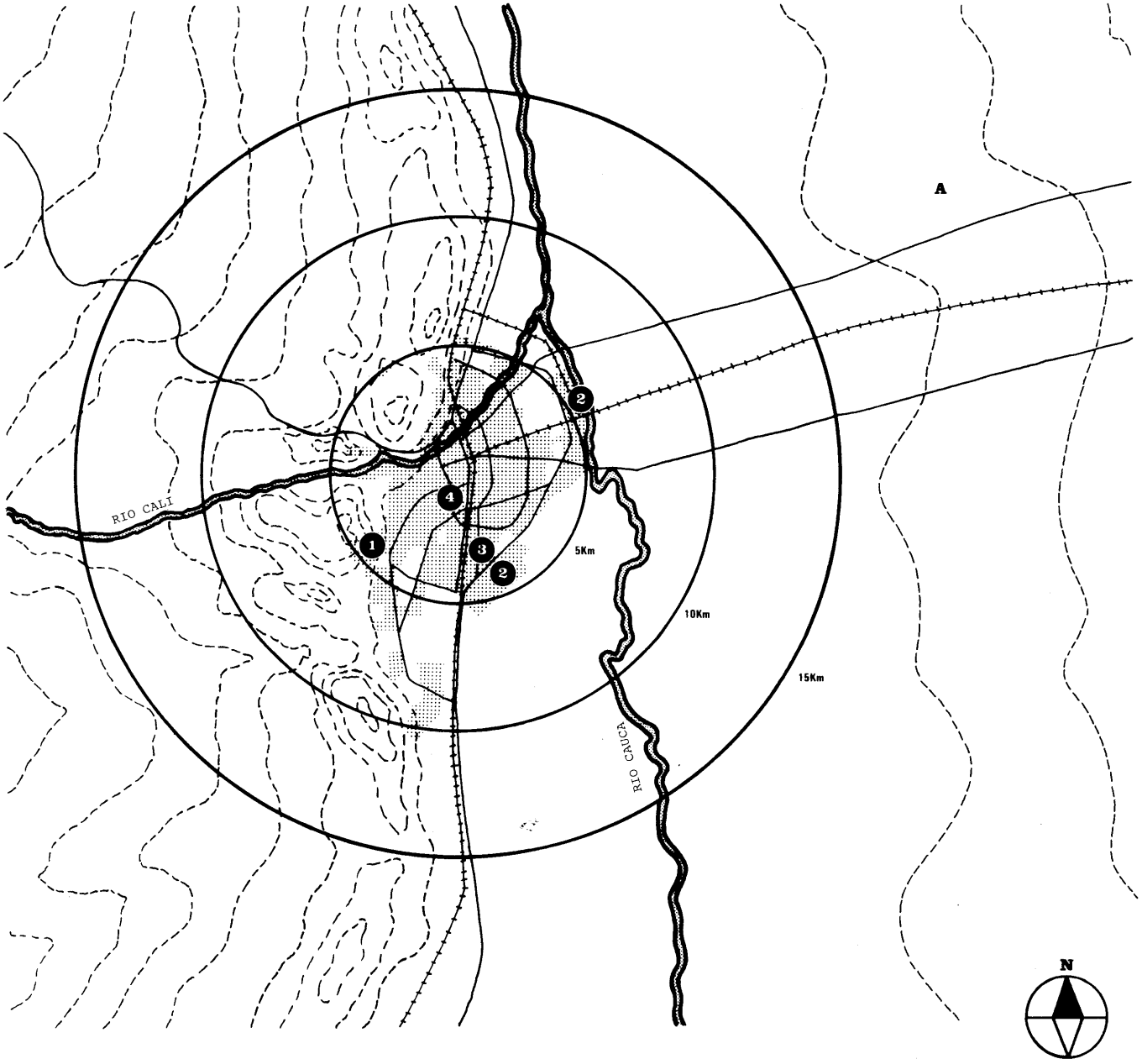
URBAN POPULATION GROWTH
horizontal: dates vertical: population
Source: Estudio de poblacion "plan general de desarrollo.



URBAN POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Plan general de desarrollo Cali 1970



URBAN ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Plan general de desarrollo Cali 1970.



KEY

A Airport

Primary Road

Railroad

Rapid Transit

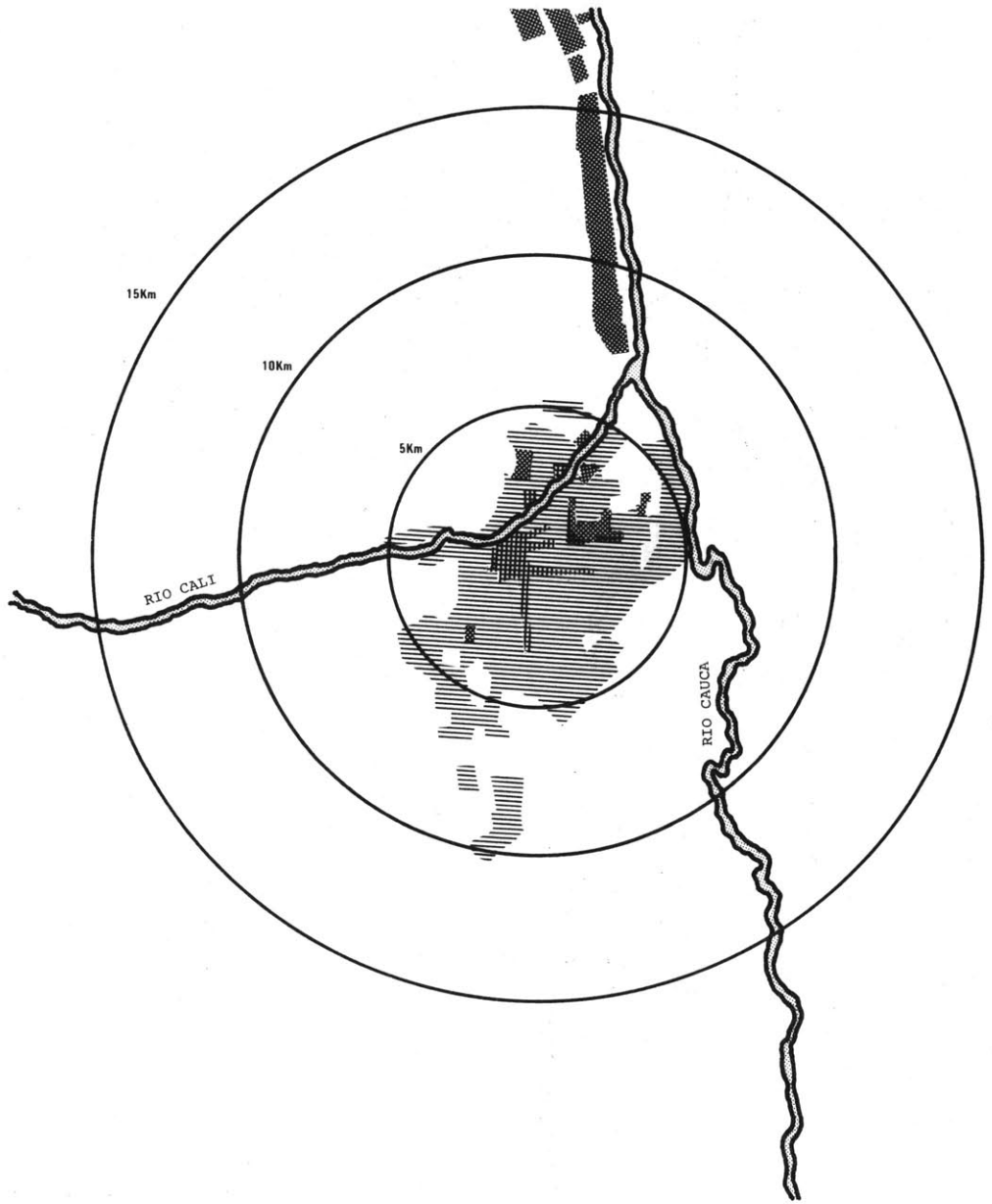
Built-up Area

CASE STUDIES

1. SILOE
2. UNION DE VIVIENDA POPULAR
3. PERIQUILLO
4. TRADITIONAL

1:250000

URBAN TOPOGRAPHY AND CIRCULATION



AREAS

RESIDENTIAL

COMMERCIAL

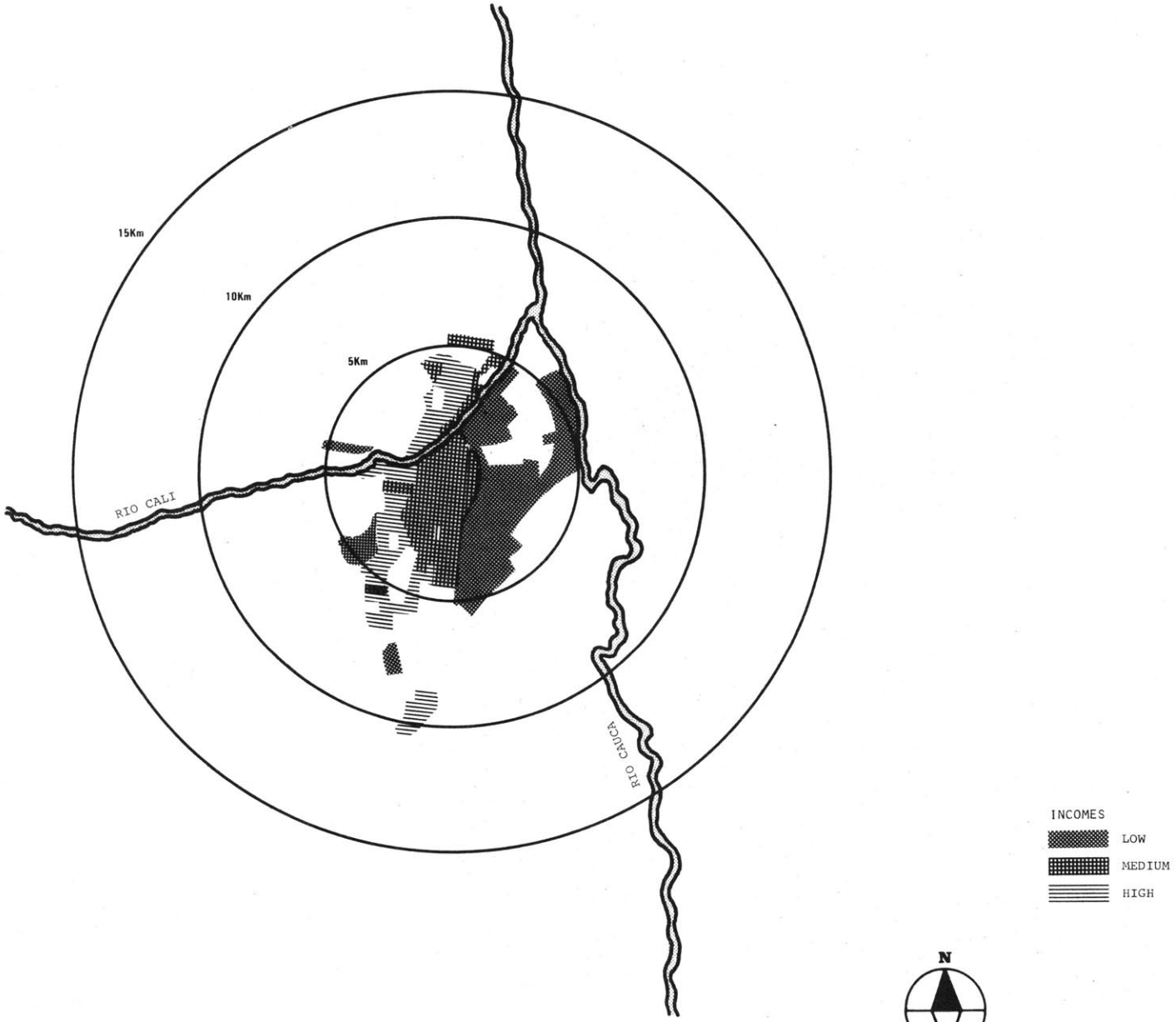
INDUSTRIAL

N

0 5 10 15Km

1:250000

URBAN LAND USE PATTERN

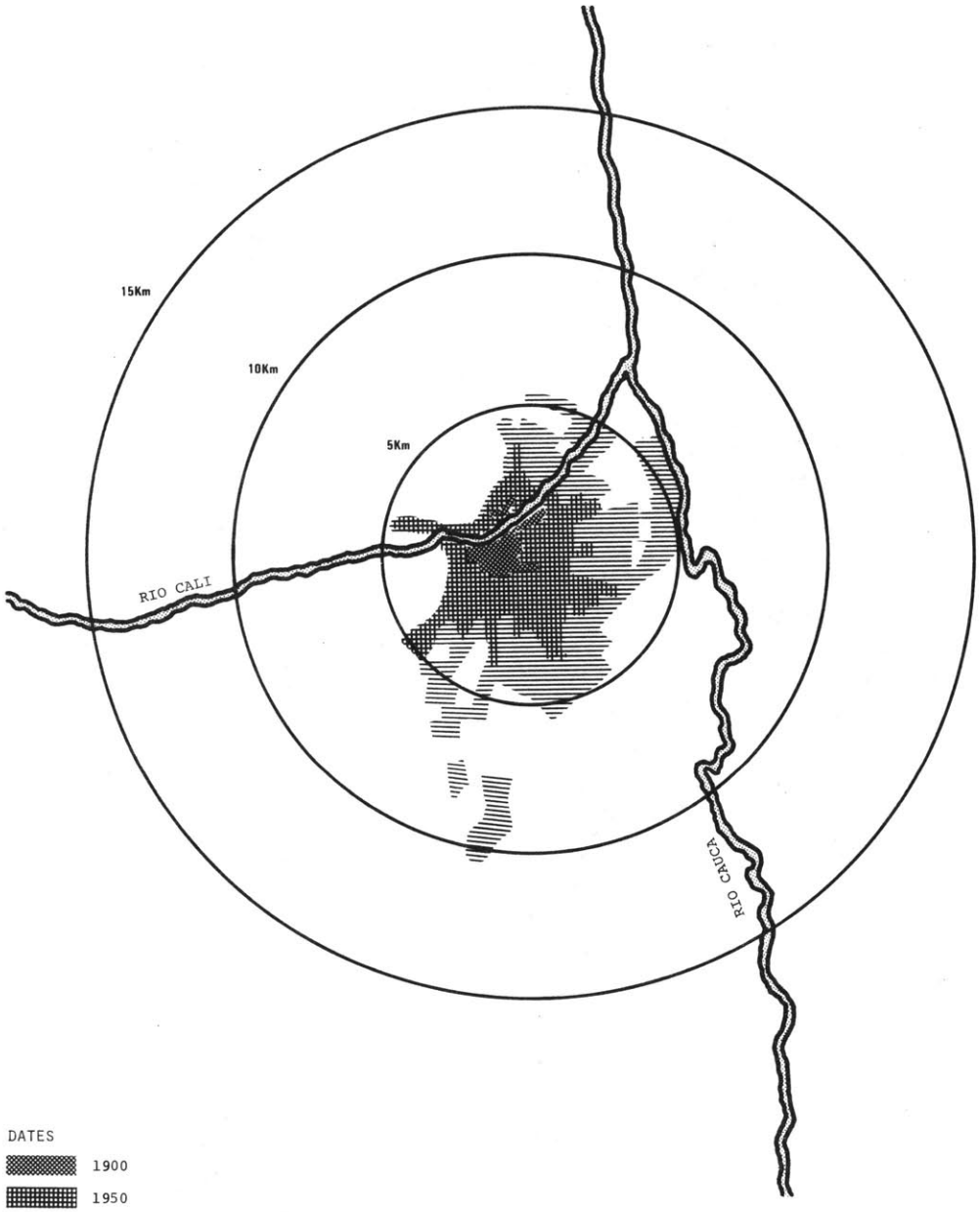


URBAN INCOME PATTERN

URBAN CONTEXT SOURCES

Urban Topography and Circulation: *(accurate) PLANNING MAPS, P.G.D. Cali, 1971-1974.*
Urban Land Use Pattern: *(approximate) IBID.*
Urban Income Pattern: *(approximate) IBID.*
Urban Growth Pattern: *(approximate) IBID.*
Climate: *CLIMA Y ARQUITECTURA EN COLOMBIA. V. Olgyay.*
Photography: *Caldas y Zamorano, J. Millan, 1974.*
General Information: *Planeacion Municipal, P.G.D.*

CALI: (opposite page) This aerial view covers the central business district of the city. Facing towards the south, the rapid growth of urban areas is noticeable.



URBAN GROWTH PATTERN

Case Studies

The following section contains case studies describing selected dwelling environments/situations within the Cali Urban Area.

The four case studies were selected according to income groups, housing systems, and population densities. Each case study is represented at four scales:

LOCALITY: A locality is defined as a relatively self-contained residential area in Cali's metropolitan area. In general, it is contained within physical boundaries.

LOCALITY SEGMENT: All the localities differ in size and shape. A segment of the same dimension has been taken from each locality for purposes of comparison. The dimension of the segment is 400 x 400 meters, a six-minute walk.

BLOCK: Within each locality segment, a typical residential block has been selected to allow comparison of land utilization (patterns, percentages, and densities) that are homogeneous. The block is bounded on all sides by circulation so that the ratio of circulation to area served may be compared.

DWELLING UNIT: A typical self-contained unit for an individual, a family, or a group in each locality segment.

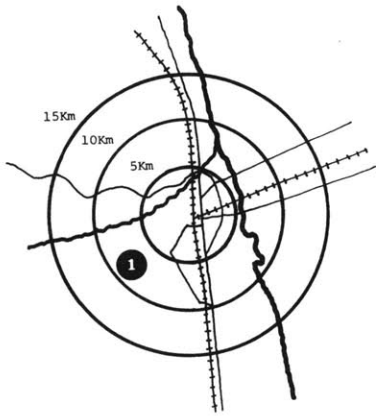
CASE STUDIES

Siloe: Popular, very low income, shanties, rooms, semi detached houses.
Union de Vivienda Popular: Popular, very low income, row houses.
Periquillo: public, low income row houses.
Traditional System: private, middle, middle low row houses.

1 SILOE
Cali

POPULAR, VERY LOW INCOME

SHANTIES, ROOMS, SEMIDETACHED HOUSES

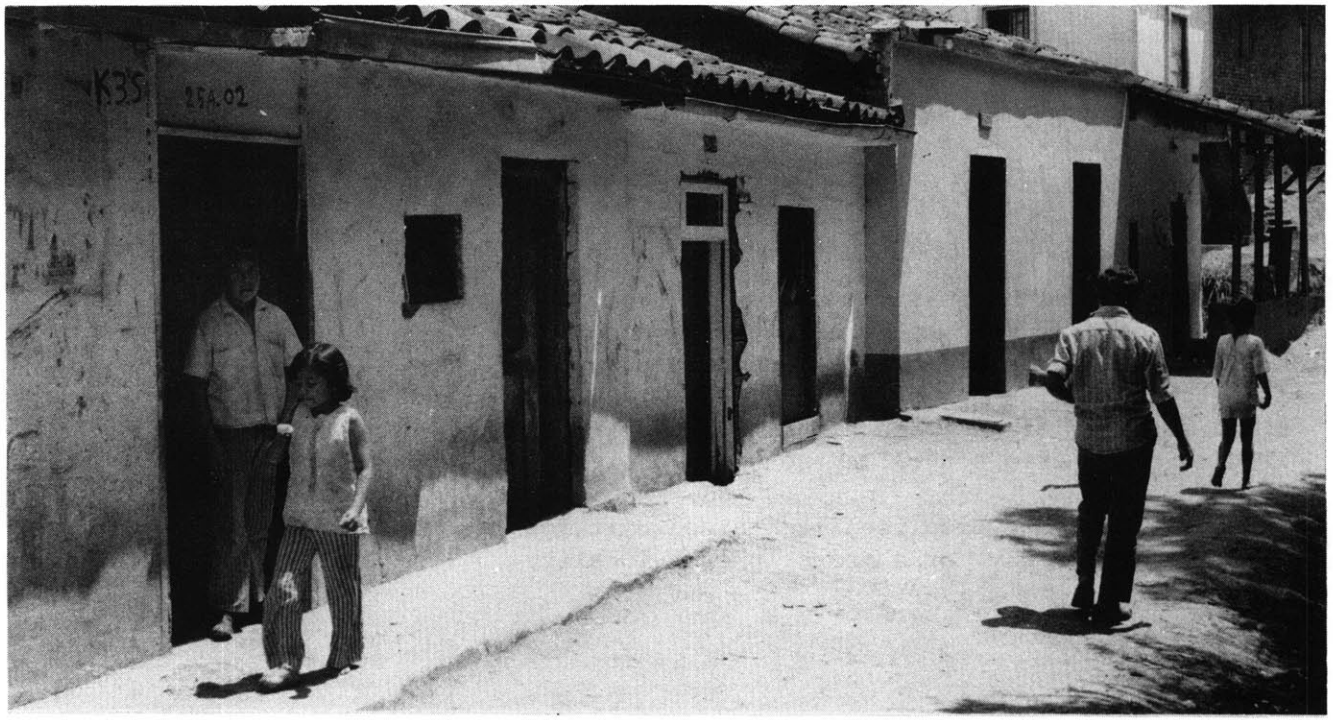


LOCATION: The area of the city of Cali known as Siloe is located on the south side of the city over the first elevations of the west mountain ranges.

The locality is bounded to the north, south, and east by different urban developments, and to the west, by the west mountain ranges.

Siloe's area is located 5 to 6km from the central business center of the city.

The entire locality is built on the slopes of a very steep hill, where the rainy season causes very serious problems.



SILOE, Cali: (top) Partial view of houses with deep slope in the back. Notice the vegetation among the dwellings.
(bottom) This view shows a secondary commercial street close to the main access to the locality.

LOCALITY PLAN

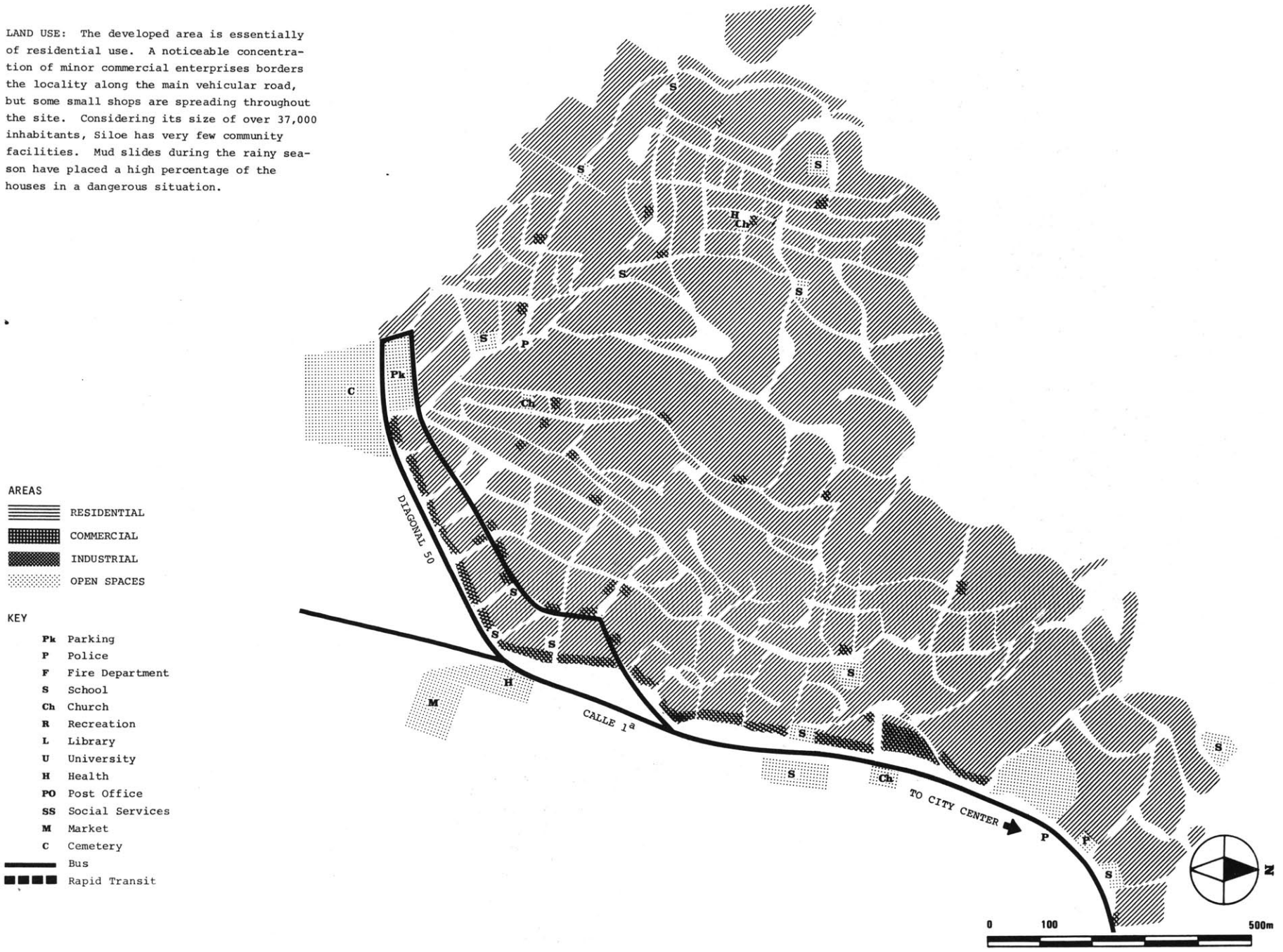
ORIGINS: A very strong and difficult political situation in Colombia created a large migration from the country to the city during the years 1944 to 1956. This is how in the city of Cali emerged the first squatter settlements which today constitute a little town in the metropolitan urban area.

The Siloe area, with a population of 34,332 inhabitants, has had its own development with almost no help from the government.

Siloe constitutes an example of a high social concentration with the attendant problems, where different authorities have been working to improve the conditions with minimal positive results and where new immigrants arrive daily.

LAYOUT: The area of Siloe is determined mainly by the fifth street which is the principle access road to the locality and by an indeterminate boundary over the hill which contains the entire settlement. The land subdivision was unplanned and is a result of squatter settlements during certain periods of time. The locality area is a dense conglomeration of rows of houses and detached houses which have deteriorated and are poor in services.

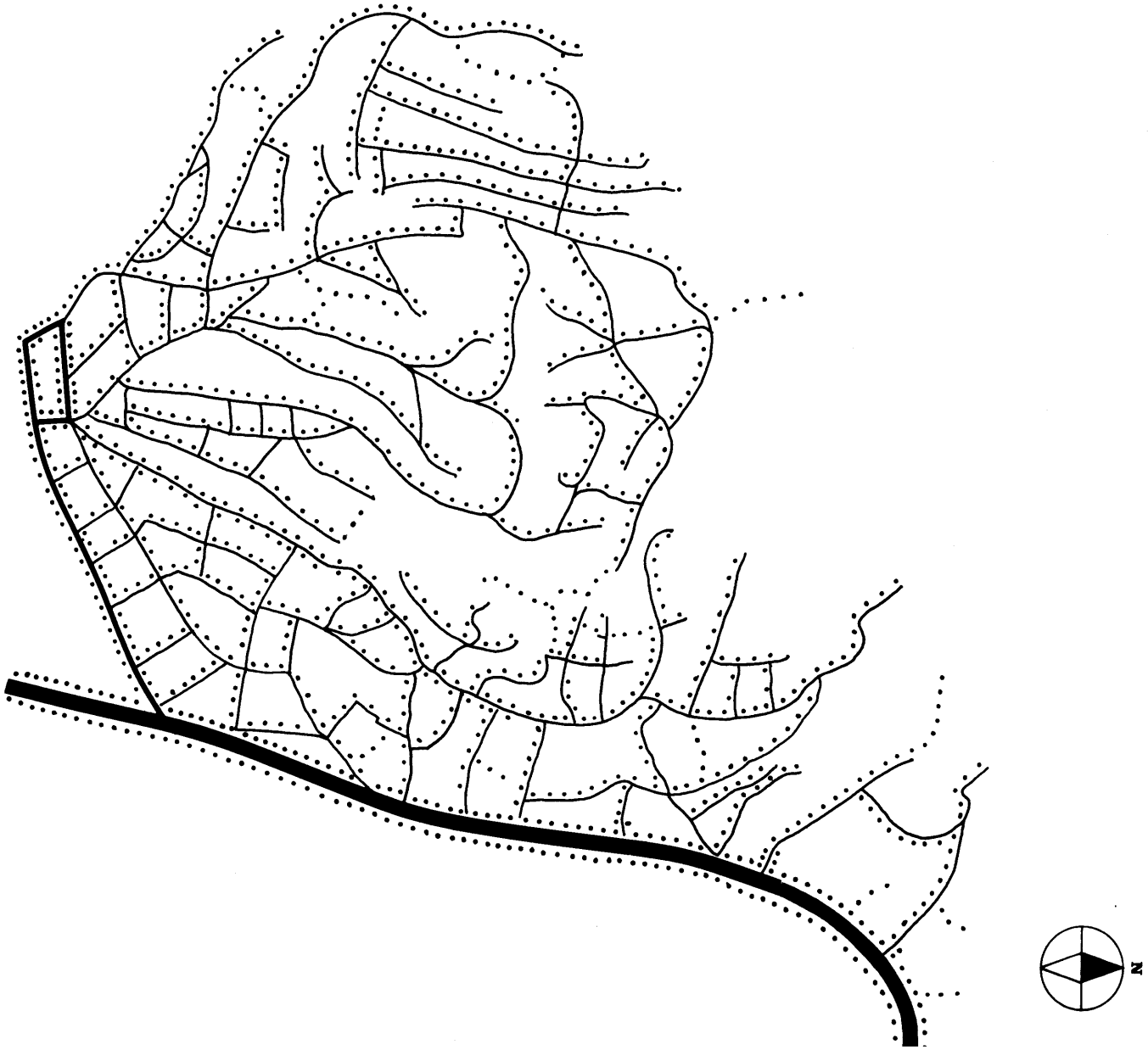
LAND USE: The developed area is essentially of residential use. A noticeable concentration of minor commercial enterprises borders the locality along the main vehicular road, but some small shops are spreading throughout the site. Considering its size of over 37,000 inhabitants, Siloe has very few community facilities. Mud slides during the rainy season have placed a high percentage of the houses in a dangerous situation.



LOCALITY LAND USE PATTERN

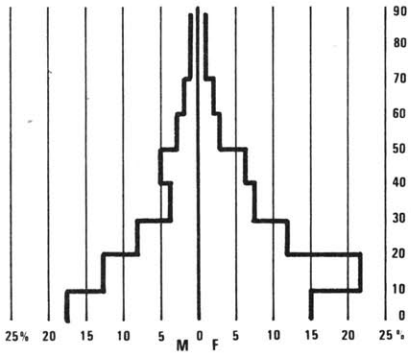
CIRCULATION: Rough topographic conditions make the site a place of 90% pedestrian circulation. The major street borders the locality from north to south and constitutes, at the same time, the major commercial street and the single way of public transportation connecting the locality with the city center.

The pedestrian circulation during the rainy season becomes a serious problem for the people because of the lack of paved, pedestrian roads.



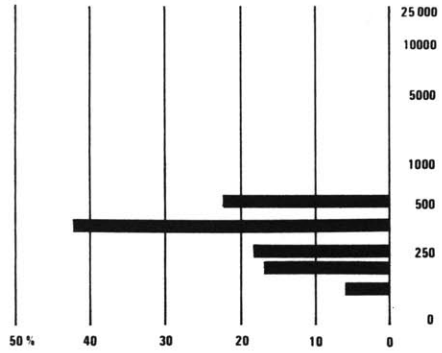
LOCALITY CIRCULATION PATTERN

POPULATION: Thirty two percent of the total population are under the age of ten as registered in the 1969 population sample. The average family has 5.6 members. Of the total population in the locality, males represent 45.1 percent.

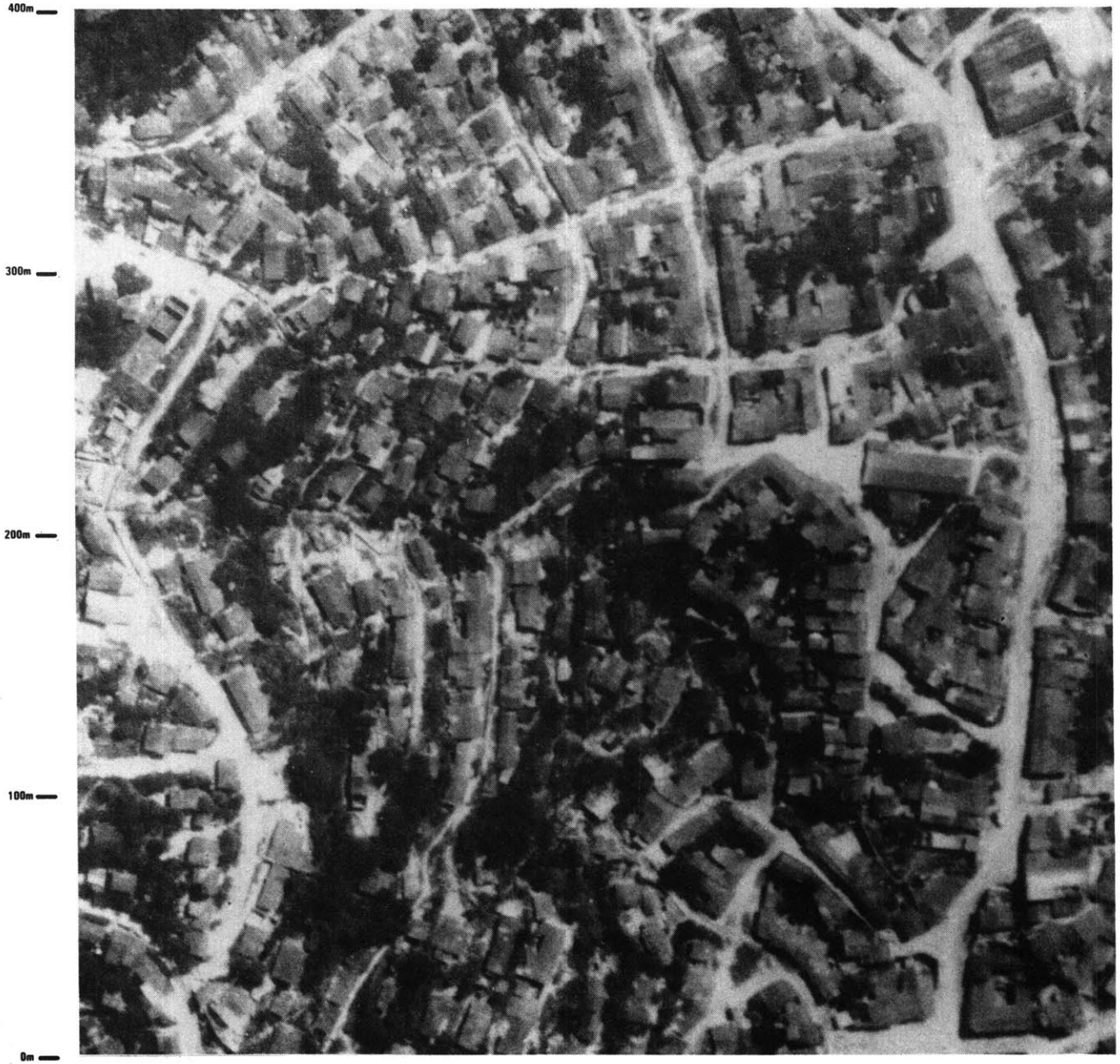


LOCALITY POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Informe Poblacion Instituto de Medicina Preventiva Cali 1969 U.V

INCOME: The average household income in 1969 was US $310. This figure represents the income for 24 percent of the population of the Cali Metropolitan Area. 15.5% of the household income is used for rent.



LOCALITY ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Informe Economico Plan General de Desarrollo Cali 1970.



LOCALITY SEGMENT AIR PHOTOGRAPH

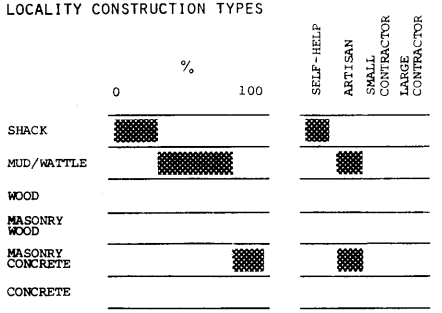
0 50 100 150m
1:2500

N

1:2500

LOCALITY SEGMENT PLAN

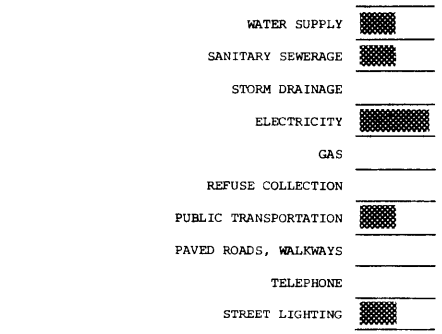
LOCALITY CONSTRUCTION TYPES



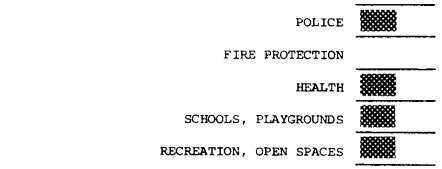
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of inrormation:

LOCALITY UTILITIES AND SERVICES



LOCALITY COMMUNITY FACILITIES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

SELECTED BLOCK

0 10 50m

1:1000

Lot lines not indicated.

LOCALITY BLOCK PLAN

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	--	--	--
DWELLING UNITS	80	1.18	67.8
PEOPLE	440	1.18	372.8

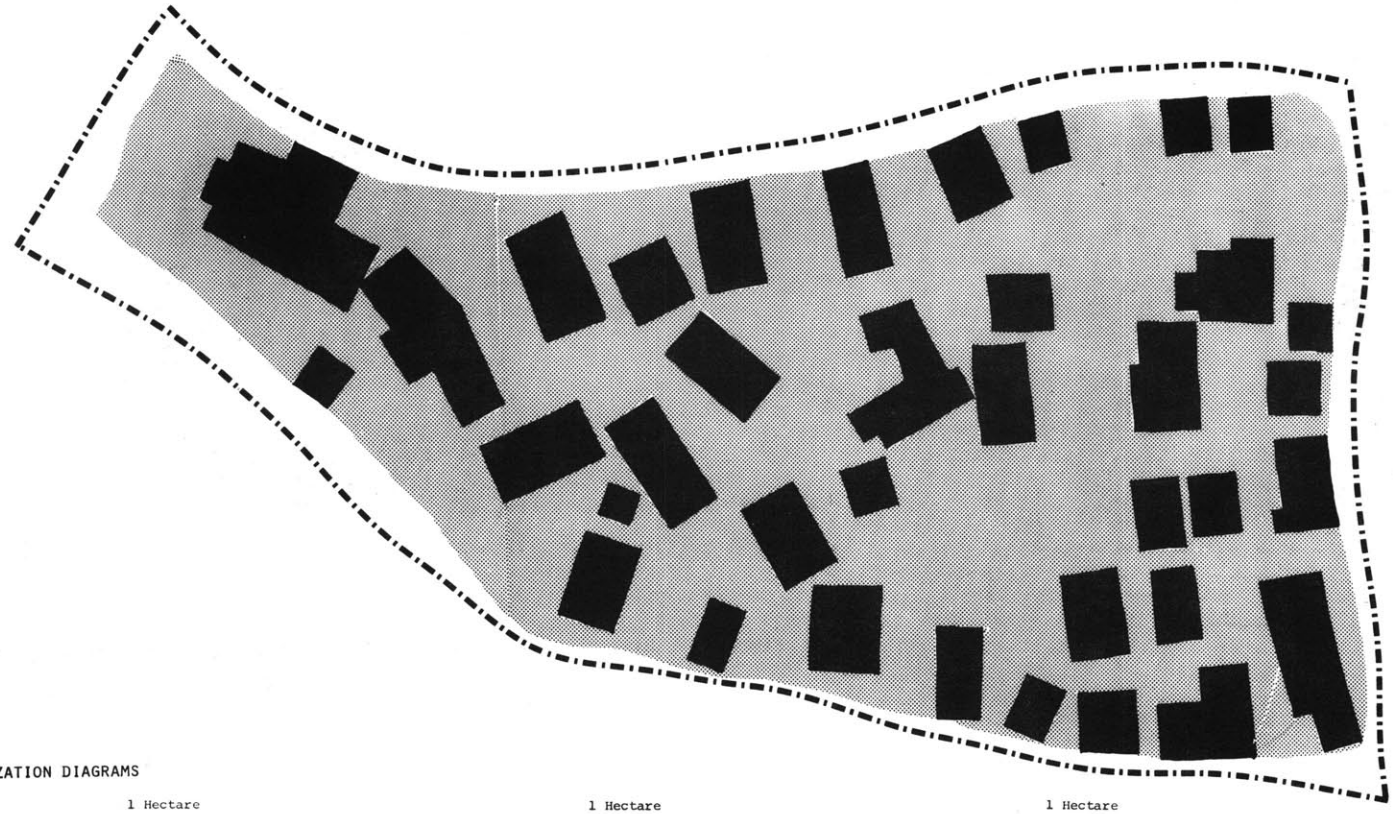
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.17	14.40
SEMI-PUBLIC (open spaces, schools, community centers)	--	--
PRIVATE (dwellings, shops, factories, lots)	1.01	85.60
SEMI-PRIVATE (cluster courts)	--	--
TOTAL	1.18	100.00

NETWORK EFFICIENCY

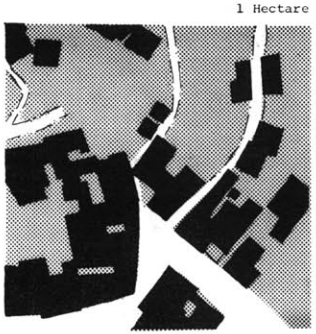
$$R = \frac{\text{network length (circulation)}}{\text{areas served (circulation, lots)}} = 210\text{m/Ha}$$

AVERAGE LOT AREA =

$$\frac{\text{total area (circulation lots)}}{\text{number of lots}} = 126\text{m}^2$$

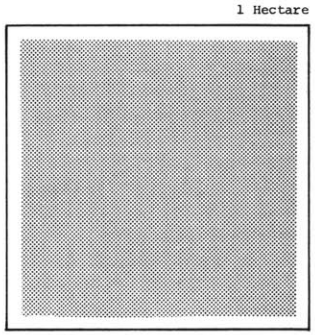


LAND UTILIZATION DIAGRAMS

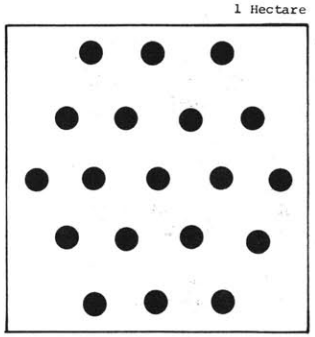


PATTERN

Public:	streets/walkways	
Semi-Public:	playgrounds	
Semi-Private:	cluster courts	
Private:	lots	
	dwellings	



PERCENTAGES Streets/Walkways 14%
Playgrounds
Cluster Courts
Dwellings/Lots 86%

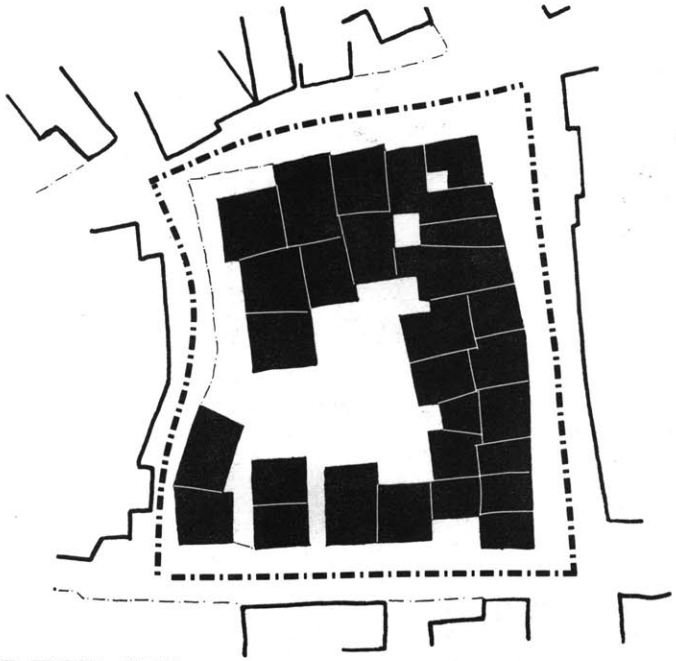


DENSITY Persons/Hectare 372

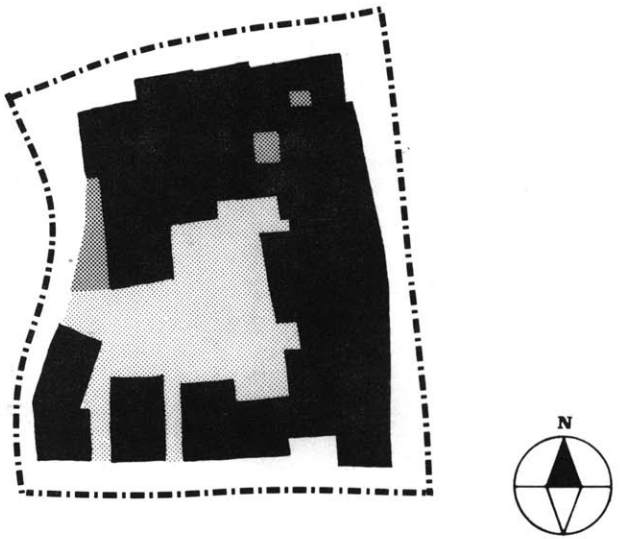
● 20 Persons

1:1000

LOCALITY BLOCK LAND UTILIZATION



LOCALITY BLOCK PLAN



LOCALITY BLOCK LAND UTILIZATION

1:1000

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	29	0.31	93.5
DWELLING UNITS	29	0.31	93.5
PEOPLE	159	0.31	512

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.1	32
SEMI-PUBLIC (open spaces, schools, community centers)	--	--
PRIVATE (dwellings, shops, factories, lots)	0.16	51.6
SEMI-PRIVATE (cluster courts)	0.05	16.4
TOTAL	0.31	100.00

NETWORK EFFICIENCY

$$R = \frac{\text{network length (circulation)}}{\text{areas served (circulation, lots)}} = 361\text{m/Ha}$$

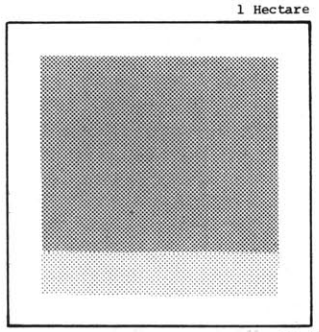
AVERAGE LOT AREA =

$$\frac{\text{total area (circulation lots)}}{\text{number of lots}} = 106\text{m}^2$$

LAND UTILIZATION DIAGRAMS

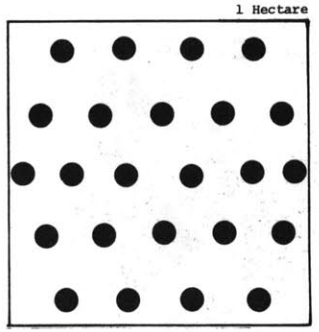
PATTERN

Public:	streets/walkways
Semi-Public:	playgrounds
Semi-Private:	cluster courts
Private:	lots
	dwellings



PERCENTAGES

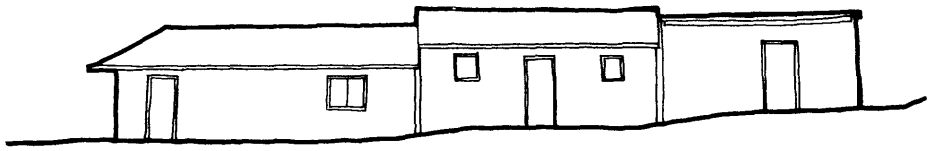
Streets/Walkways	32%
Playgrounds	
Cluster Courts	16%
Dwellings/Lots	52%



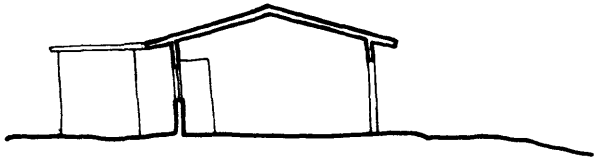
DENSITY Persons/Hectare 512

20 Persons

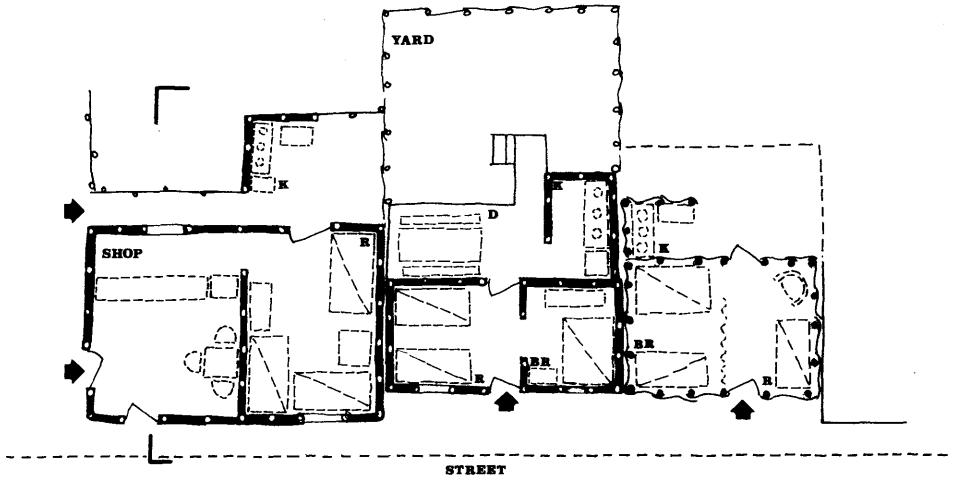
SILOE: Panoramic view of the locality.(opposite page)



ELEVATION



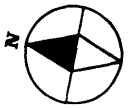
SECTION

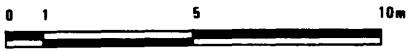


PLAN

KEY

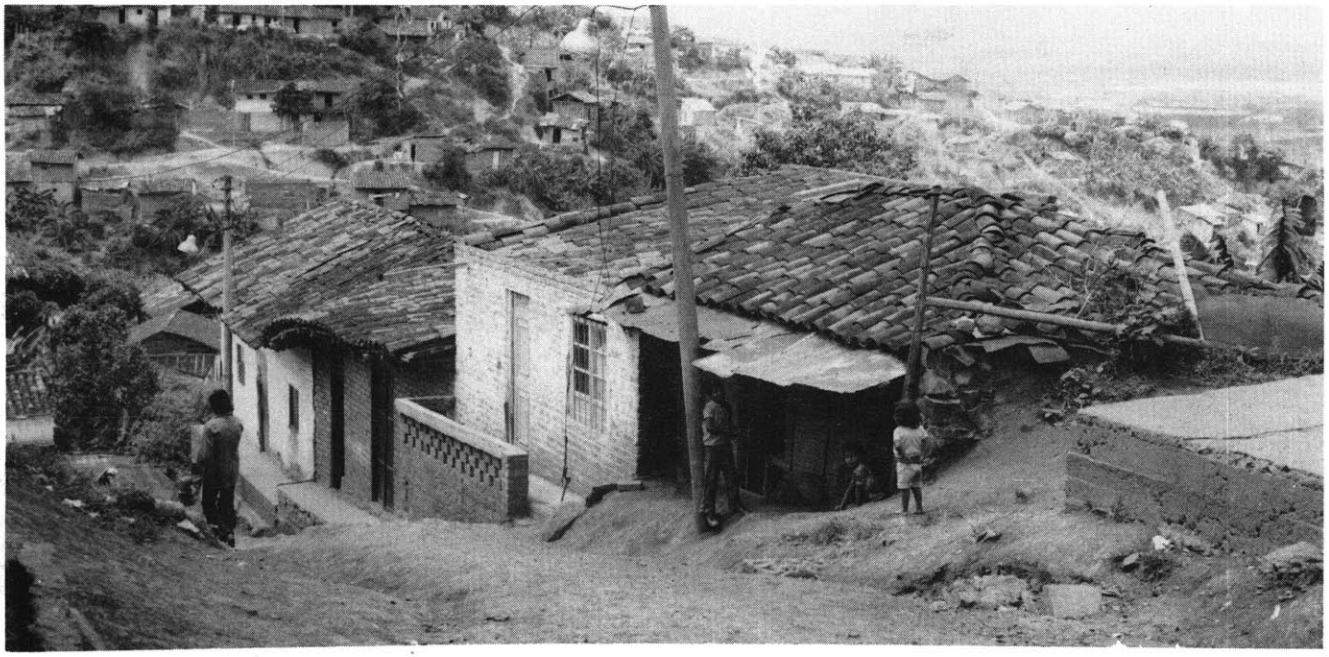
LR	Living Room
D	Dining/Eating Area
BR	Bedroom
K	Kitchen/Cooking Area
T	Toilet/Bathroom
L	Laundry
C	Closet
S	Storage
R	Room (multi-use)

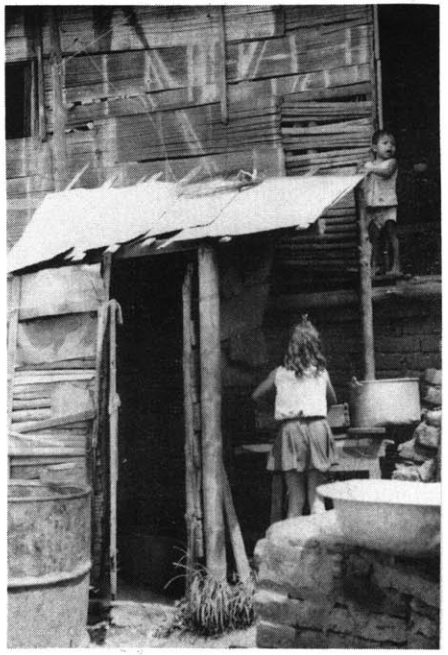




1:200

TYPICAL DWELLING





SILOE, Cali: (left) The photo shows how the local dwellers have adapted to topographic conditions. Notice the erosion problems on the unpaved roads. (right) The backyard of one of the houses shows a container to store water, laundry space, and latrine.

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT	
type:	SHANTY/ROOM/HOUSE
area (sq m):	20-80
tenure:	EXTRALEGAL/RENTAL
LAND/LOT	
utilization:	PRIVATE
area (sq m):	
tenure:	EXTRALEGAL
DWELLING	
location:	INNER RING
type:	DETACHED/ROW
number of floors:	1
utilization:	SINGLE/MULTIPLE
physical state:	BAD
DWELLING DEVELOPMENT	
mode:	INCREMENTAL
developer:	POPULAR
builder:	SELF HELP
construction type:	SHACK/MUD & WATTLE MASONRY
year of construction:	1950
MATERIALS	
foundation:	COMPACTED EARTH
floors:	MUD & WATTLE/BICK
walls:	CARDBOARD & TILE
roof:	
DWELLING FACILITIES	
wc:	NONE
shower:	NONE
kitchen:	1
rooms:	1-2-3
other:	PIT LATRINE

SOCIO-ECONOMIC DATA
(related to user)

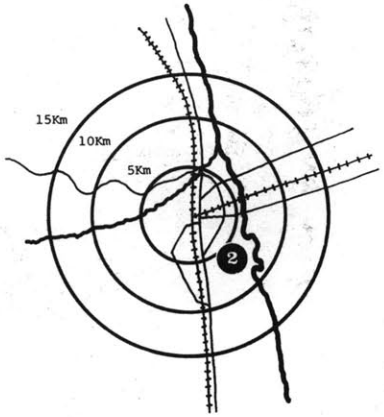
GENERAL: SOCIAL	
user's ethnic origin:	COLOMBIANS
place of birth:	STATE OF VALLE
education level:	INCOPLETED PRIMARY SCHOOL
NUMBER OF USERS	
married:	2
single:	
children:	5-6
total:	7
MIGRATION PATTERN	
number of moves:	1
rural - urban:	1950
urban - urban:	
urban - rural:	
why came to urban area:	EMPLOYMENT
GENERAL: ECONOMIC	
user's income group:	VERY LOW
employment:	LABOR
distance to work:	5 TO 15 KM
mode of travel:	PUBLIC TRANSPORTATION
COSTS	
dwelling unit:	N.A.
land - market value:	2-4 $ US/m2
DWELLING UNIT PAYMENTS	
financing:	SELF FINANCED
rent/mortgage:	5 US $/MONTH
% income for rent/mortgage:	15.6%

LOCALITY SOURCES

Plan:	*(accurate) Aerofoto Cali, 1973.*
Land Use Pattern:	*(approximate) Field Survey, J. Millan, 1974; P.G.D. Cali.*
Circulation Pattern:	*(approximate) Field Survey, J. Millan, 1974.*
Segment Plan:	*(approximate) Aerofoto Cali, 1973.*
Block Plan:	*(approximate) IBID.*
Block Land Utilization:	*(approximate) IBID.*
Typical Dwelling:	*(accurate) Field Survey, J. Millan, 1974.*
Physical Data:	*(accurate) P.G.D. Cali, 1971-1980.*
Socio-Economic Data:	*(accurate) IBID.*
Photographs:	*Aerofoto de Cali, Caldas Asociados, 1974; J. Millan, 1974.*
General Information:	*P.G.D. 1971, Planeacion Municipal Cali, 1974.*

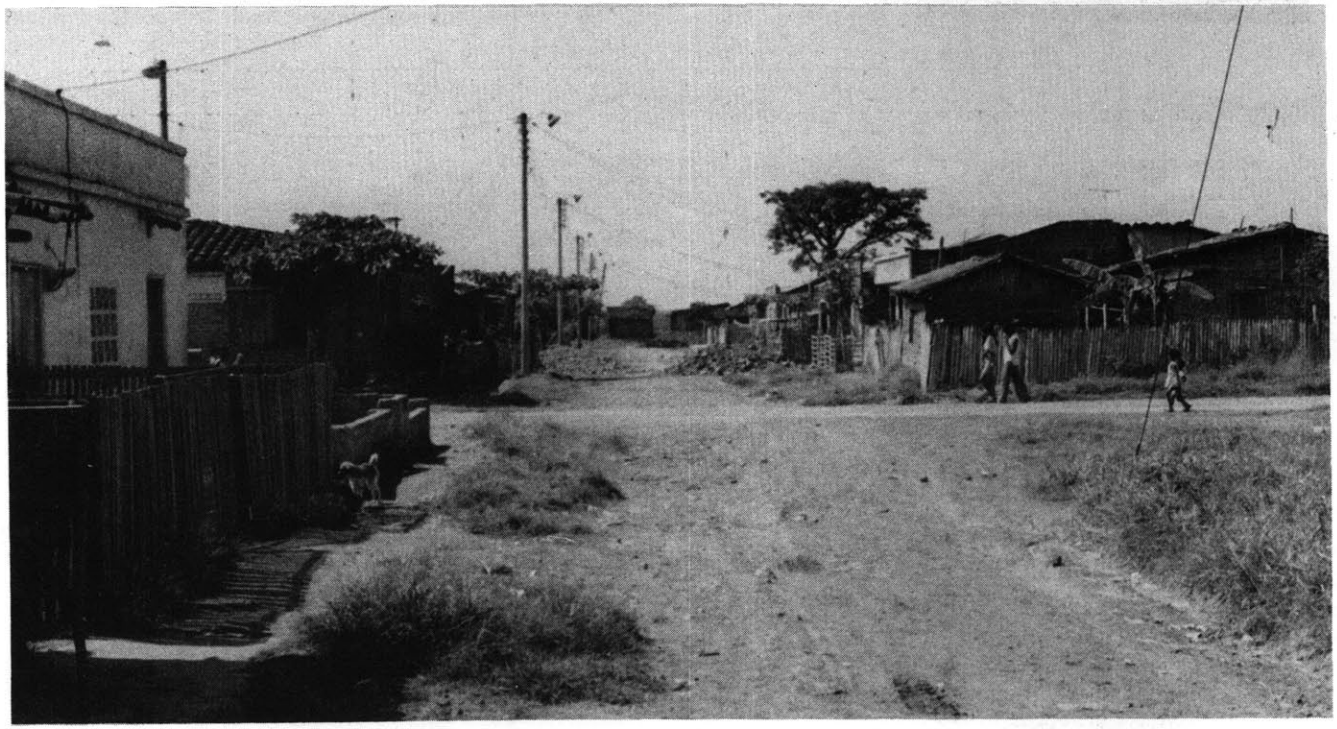
2 UNION DE VIVIENDA POPULAR
Cali

POPULAR, VERY LOW INCOME, ROW HOUSES.



LOCATION: The area known as Union de Vivienda Popular is located on the southwest side of the city. It is bounded to the north by the Oriental Highway and popular dwelling development, and to the south, east, and west by undeveloped lands.

The locality's distance from the central business center is about 6km.



UNION DE VIVIENDA POPULAR, Cali: (top) Partial view of the community center (school, playground); in the background, notice the houses which surround the community center.
(bottom) This view, along one of the typical residential streets in the locality, shows the absence of vehicles as evidence of pedestrian use.

LOCALITY PLAN

ORIGINS: The area of Union de Vivienda Popular constitutes one of the biggest dwellings developments among people of the low income levels.

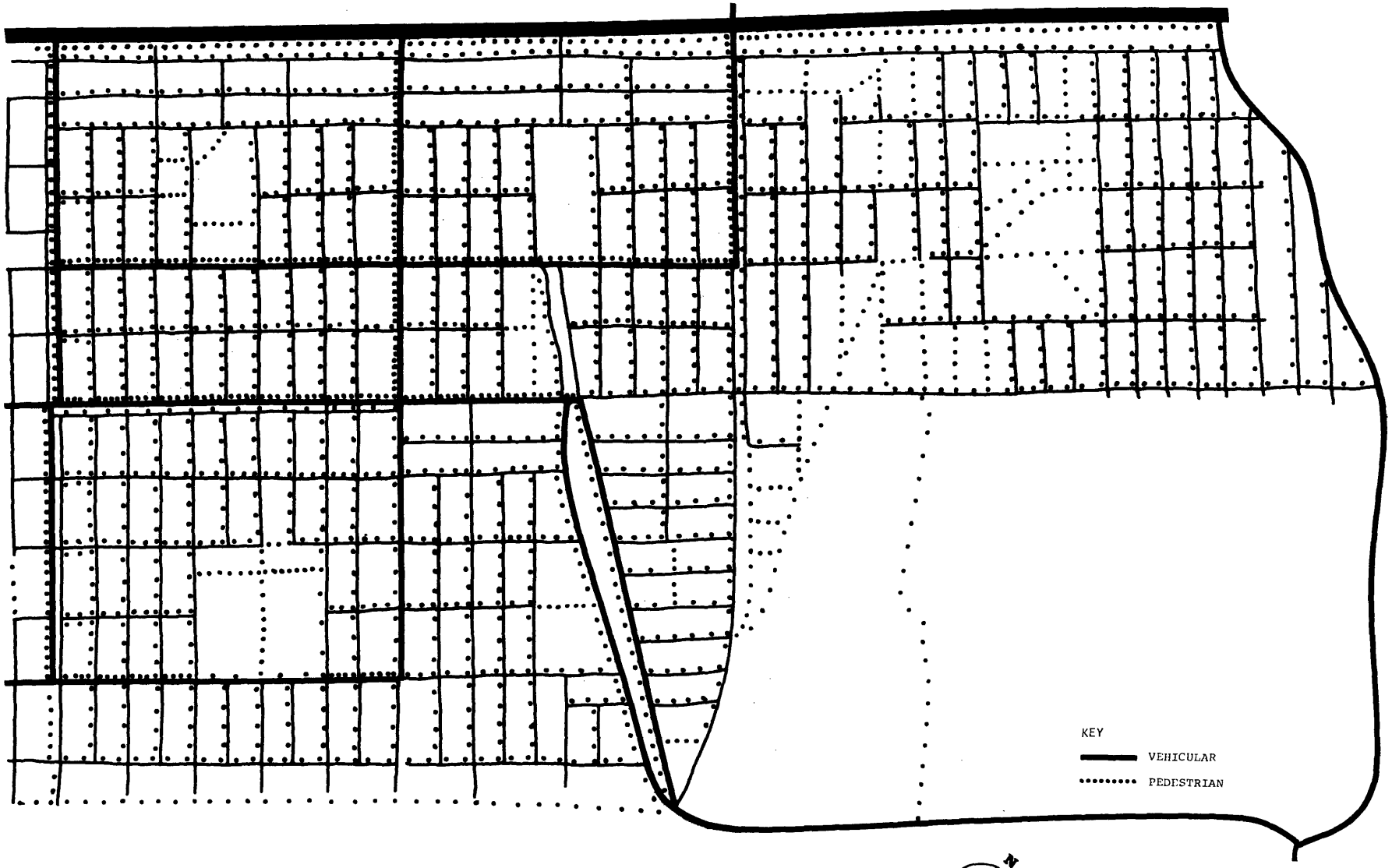
During the years 1960 to 1968, the city of Cali had a great demand for housing from the popular sectors. The demand is very noticeable because of the frequent invasion of land by the people. This situation forced the government authorities to urbanize what today constitutes the locality of Union de Vivienda Popular by giving the people lots without any construction on it and without adequate facilities or utilities.

This community's population grows daily, and its sprawl is taking over open land surrounding the locality. Of course this kind of growth precludes providing the minimum requirements of utilities and services.

Today the locality has a population of 51,137 inhabitants.

LAYOUT: The settlement is located on the outskirts of the city, parallel to the Oriental Highway. The Union de Vivienda Popular layout is a typical rectangular grid with the major streets running every 500 to 600 meters, forming superblocks with a central area in which all community facilities are supposed to be located. The total occupied area is approximately 273 Ha giving a gross density of 281 persons per hectare.

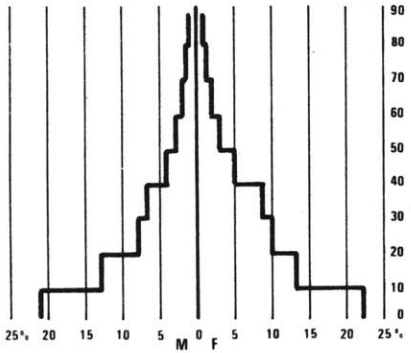
LOCALITY LAND USE PATTERN



LOCALITY CIRCULATION PATTERN

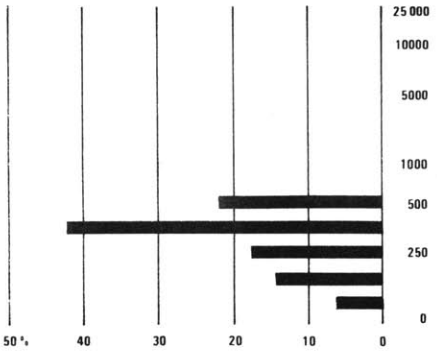
CIRCULATION: The grid shows an area planned for vehicular movement, but this movement is very limited because there are few vehicles of public transportation on the main streets. Because of this, pedestrian circulation becomes the main traffic in the area. The majority of streets are not paved, and because there is a lack of streets and green areas in general, the locality is a hot place to live.

POPULATION: The largest age group was under 20 and the smallest age group was over 60. 57.8 percent of the total population were females with an average age of 10-20. The males represented 42.2 percent of the population with an average age of 17.



LOCALITY POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Informe Poblacion Plan General de Desarrollo 1970. Instituto Medecina Preventiva Cali, 1969 U.V.

INCOME: The average household income in 1969 was US $300 to $350. This figure represents the income of 24 percent of the population of the total Cali Metropolitan Area. 13.60 percent of the housefold income is used for rent and mortgage.



LOCALITY ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Informe Plan General de Desarrollo, 1970
Instituto Medicina Preventiva, 1969 U.V.

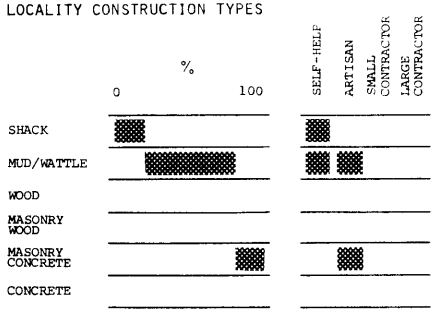
1:2500

LOCALITY SEGMENT AIR PHOTOGRAPH

LOCALITY SEGMENT PLAN

1:2500

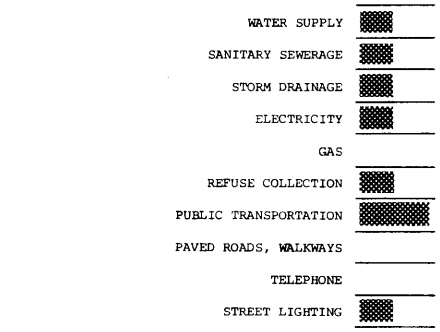
LOCALITY CONSTRUCTION TYPES



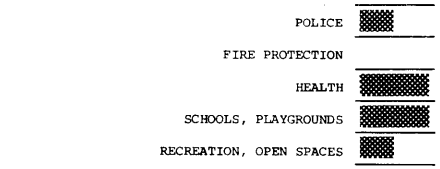
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES



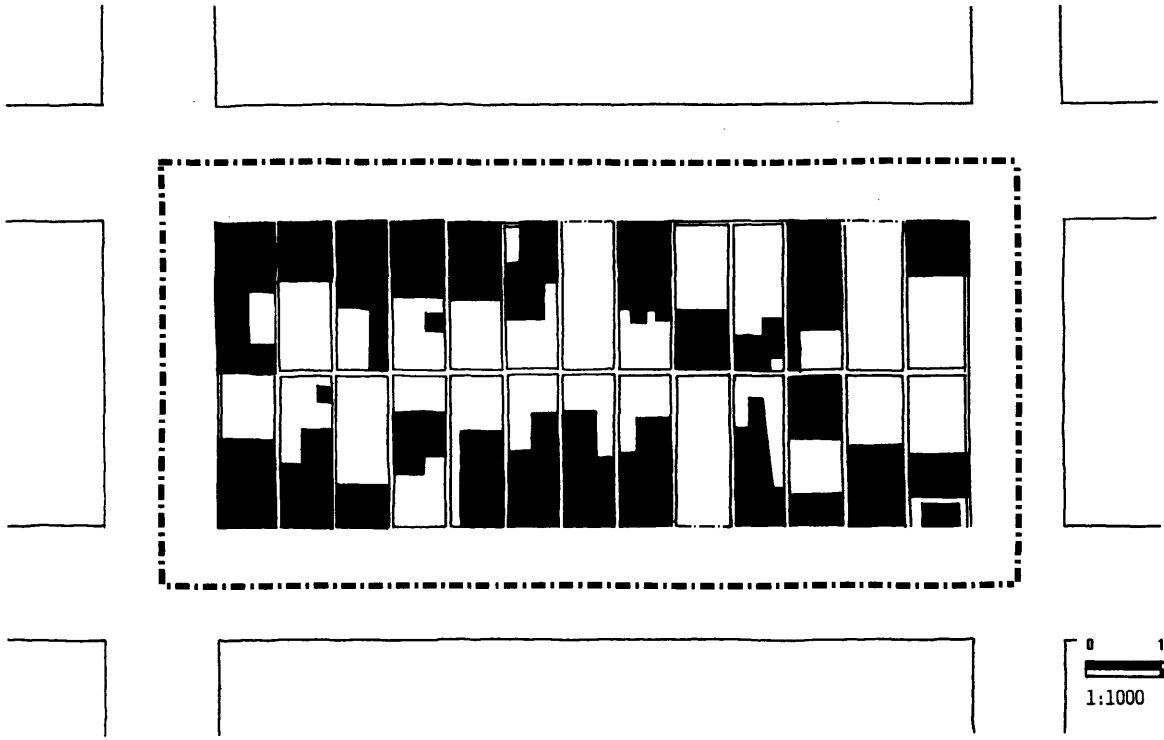
LOCALITY COMMUNITY FACILITIES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

SELECTED BLOCK



LOCALITY BLOCK PLAN

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	26	0.62	41.94
DWELLING UNITS	24	0.62	38.70
PEOPLE	132	0.62	213

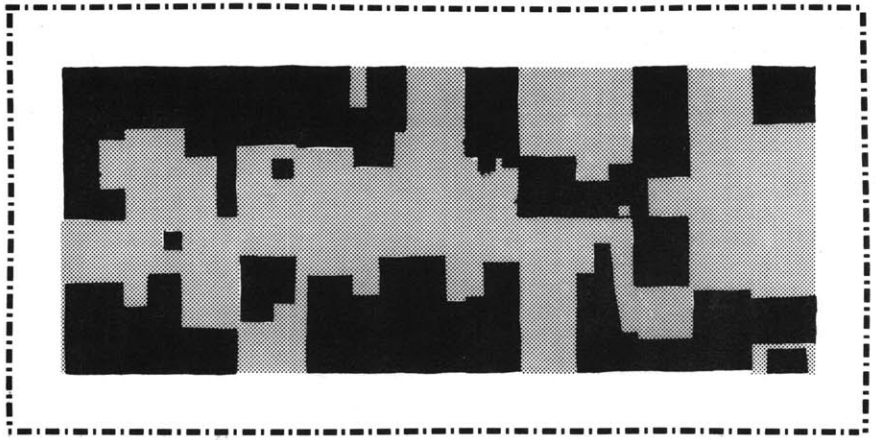
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.22	35
SEMI-PUBLIC (open spaces, schools, community centers)	--	--
PRIVATE (dwellings, shops, factories, lots)	0.40	65
SEMI-PRIVATE (cluster courts)	--	--
TOTAL	0.62	100.00

NETWORK EFFICIENCY

$$R = \frac{\text{network length (circulation)}}{\text{areas served (circulation, lots)}} = 270\text{m/Ha}$$

AVERAGE LOT AREA =

$$\frac{\text{total area (circulation lots)}}{\text{number of lots}} = 238\text{m}^2$$

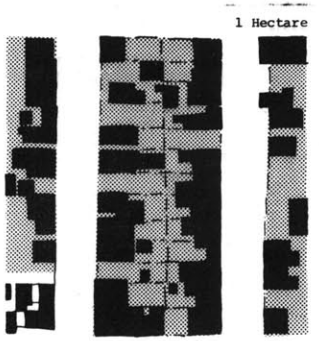


LOCALITY BLOCK LAND UTILIZATION

0 10 50m

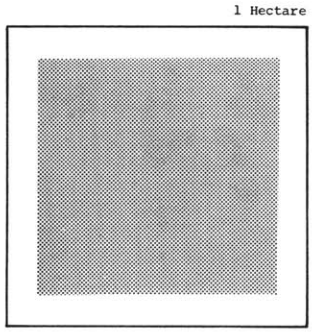
1:1000

LAND UTILIZATION DIAGRAMS



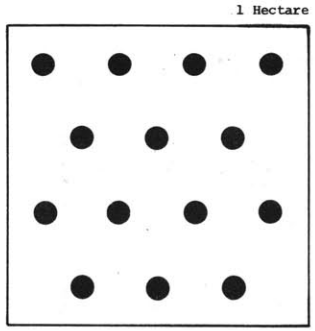
PATTERN

Public:	streets/walkways	
Semi-Public:	playgrounds	
Semi-Private:	cluster courts	
Private:	lots	
	dwellings	



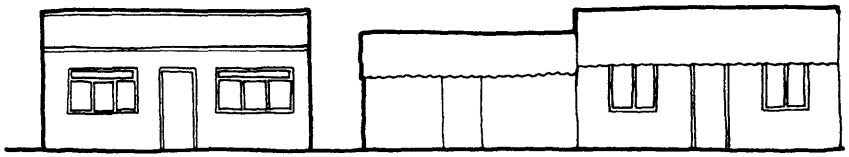
PERCENTAGES

Streets/Walkways	35%
Playgrounds	
Cluster Courts	
Dwellings/Lots	65%

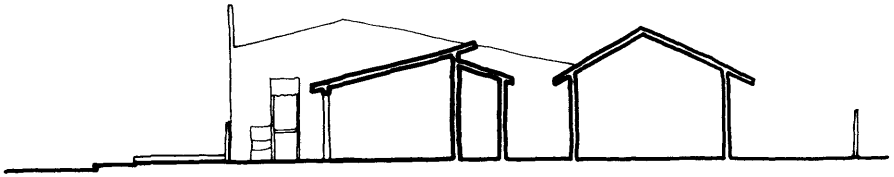


DENSITY Persons/Hectare 213

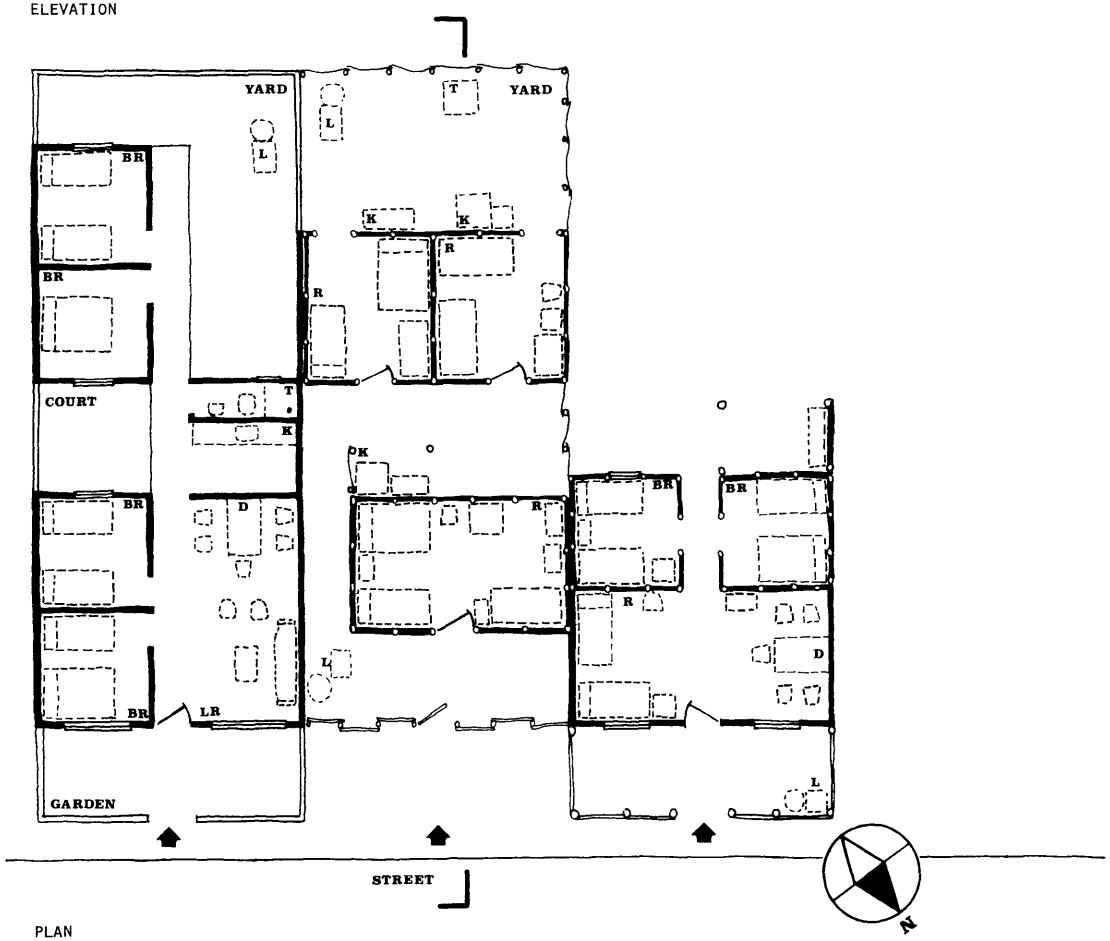
20 Persons



ELEVATION



SECTION



PLAN

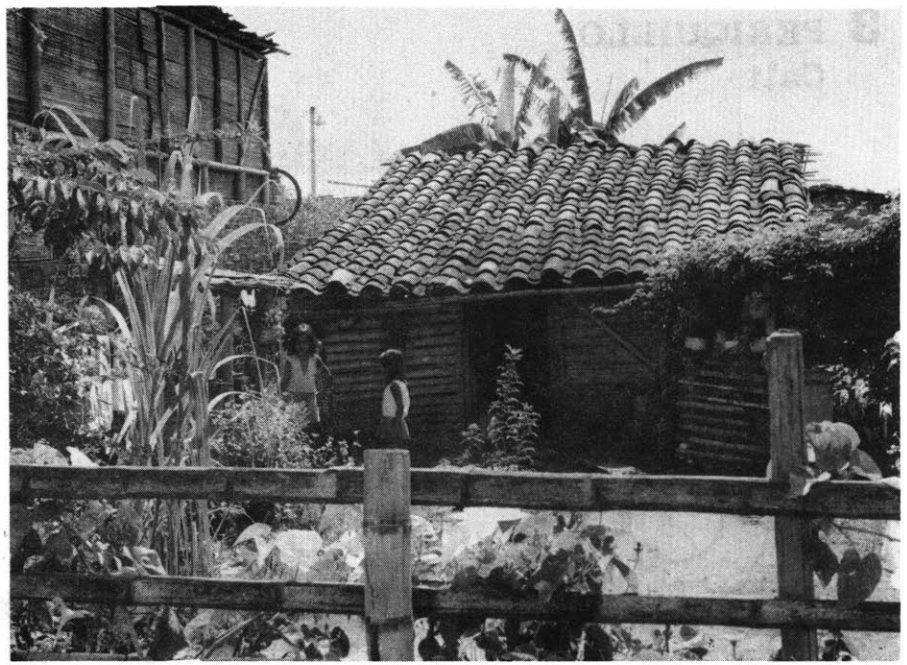
KEY

LR Living Room
D Dining/Eating Area
BR Bedroom
K Kitchen/Cooking Area
T Toilet/Bathroom
L Laundry
C Closet
S Storage
R Room (multi-use)

0 1 5 10m

1:200

TYPICAL DWELLING



UNION DE VIVIENDA POPULAR, Cali: (left) The photograph shows how people initially connect the dwelling to the water line and how they use the setback instead of leaving it as an open space.
(right) Front of a house built in bamboo. Notice the large setback and how the dweller places the latrine and laundry next to the main entrance; common situation in the locality. Notice how dwellers improve the house with a variety of plants and flowers.

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT	
type:	SHANTY/ROOM/HOUSE
area (sq m):	20-100m2
tenure:	LEGAL RENTAL/OWNERSHIP
LAND/LOT	
utilization:	PRIVATE
area (sq m):	140 m2
tenure:	LEGAL OWNERSHIP
DWELLING	
location:	OUTSKIRTS
type:	ROW HOUSES
number of floors:	1
utilization:	SINGLE &MULTIPLE FAMILY
physical state:	BAD
DWELLING DEVELOPMENT	
mode:	INCREMENTAL
developer:	POPULAR
builder:	SELF HELP
construction type:	SHACK MUD & WATTLE
year of construction:	1966
MATERIALS	
foundation:	
floors:	COMPACTED EARTH
walls:	MUD/WATTLE/BRICK
roof:	ROMAN TILE
DWELLING FACILITIES	
wc:	NONE
shower:	
kitchen:	1
rooms:	1-2-3
other:	PIT LATRINE

SOCIO-ECONOMIC DATA
(related to user)

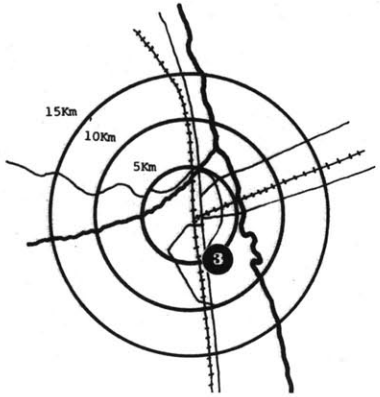
GENERAL: SOCIAL	
user's ethnic origin:	COLOMBIANS
place of birth:	VALLE STATE
education level:	INCOMPLETED PRIMARY SCHOOL
NUMBER OF USERS	
married:	2
single:	
children:	5
total:	7
MIGRATION PATTERN	
number of moves:	2
rural - urban:	1958
urban - urban:	1965
urban - rural:	
why came to urban area:	EMPLOYMENT
GENERAL: ECONOMIC	
user's income group:	VERY LOW
employment:	LABOR
distance to work:	5 TO 10 KM
mode of travel:	PUBLIC TRANSPORTATION
COSTS	
dwelling unit:	N.A.
land - market value:	2-4 US $/m2
DWELLING UNIT PAYMENTS	
financing:	SELF FINANCED
rent/mortgage:	4US $/MONTH
% income for rent/mortgage:	13.7 %

LOCALITY SOURCES

Plan:	*(accurate) Aerofoto Cali, 1973.*
Land Use Pattern:	*(approximate) Field Survey, J. Millan, 1974; P.G.D. Cali.*
Circulation Pattern:	*(approximate) Field Survey, J. Millan, 1974.*
Segment Plan:	*(approximate) Aerofoto Cali, 1973.*
Block Plan:	*(approximate) IBID.*
Block Land Utilization:	*(approximate) IBID.*
Typical Dwelling:	*(accurate) Field Survey, J. Millan, 1974.*
Physical Data:	*(accurate) P.G.D. Cali, 1971-1980.*
Socio-Economic Data:	*(accurate) IBID.*
Photographs:	*Aerofoto de Cali, Caldas Asociados, 1974; J. Millan, 1974.*
General Information:	*P.G.D. 1971; Planeacion Municipal Cali, 1974.*

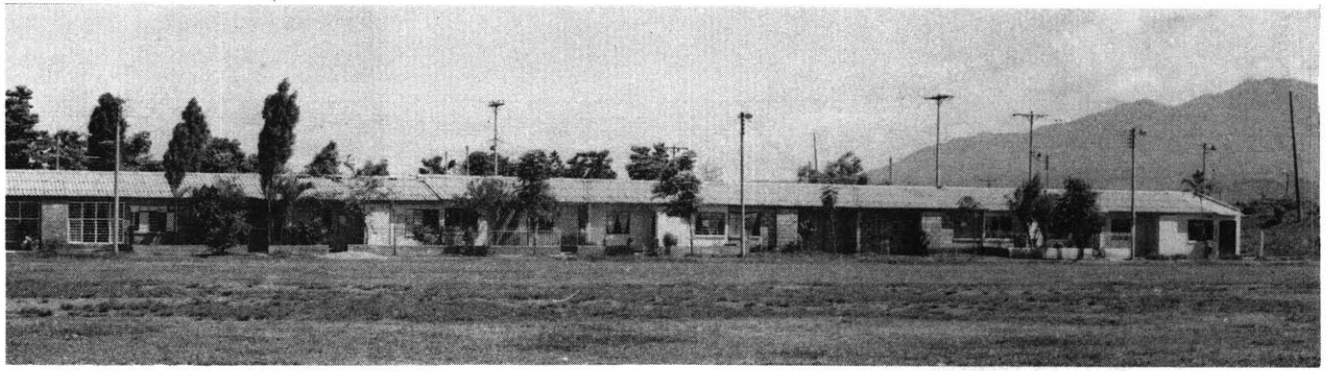
3 PERIQUILLO
Cali

PUBLIC, LOW INCOME, ROW HOUSES.

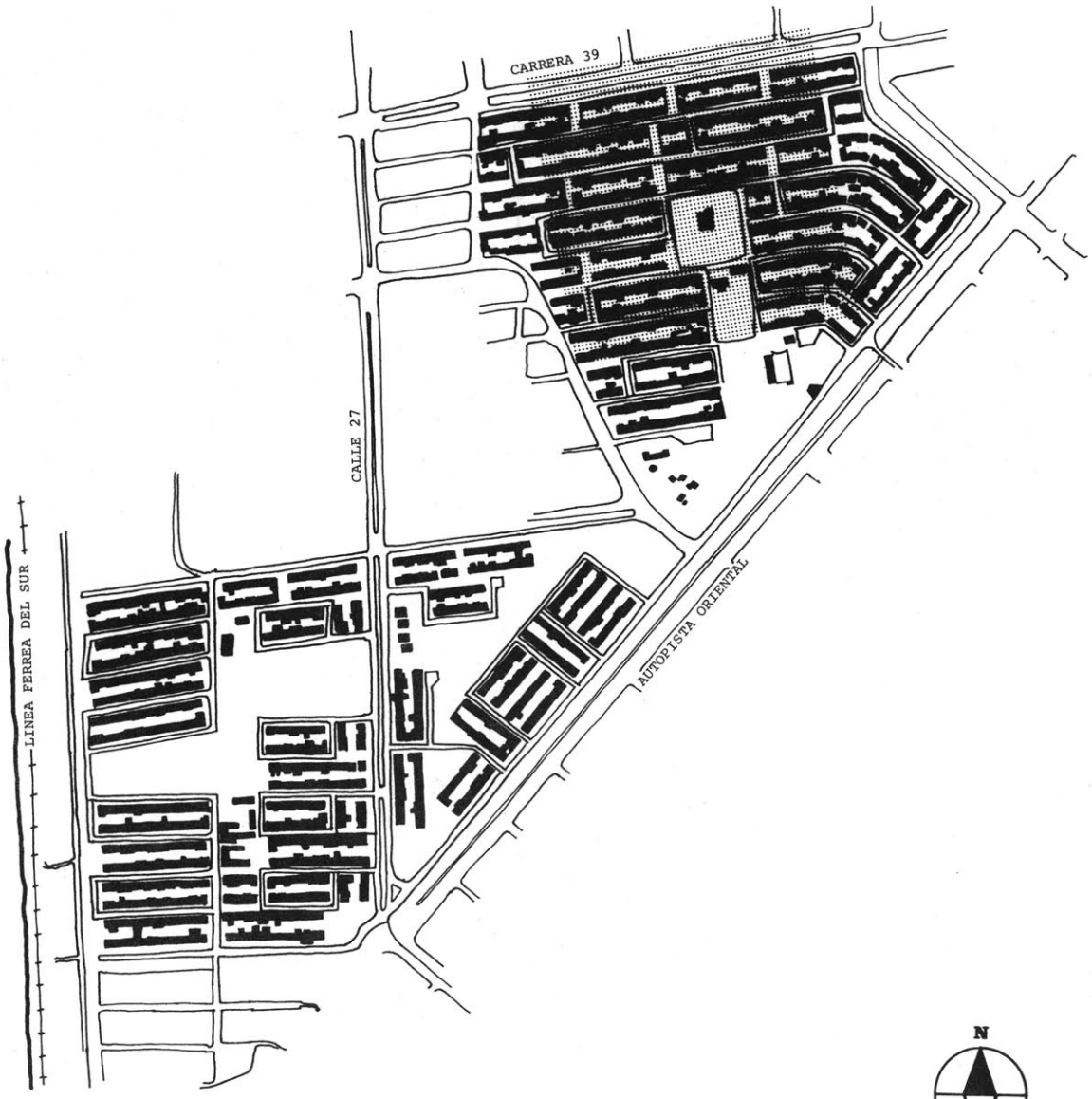


LOCATION: The locality of Periquillo is located on the southeast side of the city. It is bounded to the north by popular housing developments, to the south by open land without any development, to the east by the Oriental Highway, and to the west by the southern railroad.
This locality is approximately 5km from the central business district of the city.

ORIGINS: Periquillo's area is one of the projects carried out by the Instituto de Credito Territorial (a government agency) for the low income people. The specific project was planned with the participation of the community, and with the continuous assistance of the government's specialists in construction and with social workers.
Because of the good results obtained, the project has been considered one of the best examples of the government's efforts to provide housing.



PERIQUILLO, Cali: (top) Overall view of dwelling facing the open area which is used as a soccer field. (bottom) Typical facade built and improved by the users. Since the project is not planned for small commerce, the users solve the problem by selling goods through open windows or by using the living room.



SELECTED SEGMENT

LOCALITY PLAN

LAYOUT: The Periquillo layout was planned by professionals in the Instituto de Credito Territorial, and was developed by the community with the assistance of architects and social workers from that government agency.

The site is clearly determined by the Oriental Highway to the east, the railroad to the west, and by the 39 Avenue to the north.

Blocks are rectangular in shape and the orientation of the lots is mainly north-south. The layout emphasizes interior streets and big, open spaces for recreation, community facilities, and services.

LAND USE: The locality of Periquillo was developed as private residential land for the use of low income households.

The total occupied area is approximately 66 hectares giving a gross density of 169 persons per hectare.

Of the total area: 27.92 Ha are residential, 0.47 Ha are commerical, 1.04 Ha are insitutional, 0.06 Ha are industrial, 17 Ha are green areas and playgrounds, and 19 Ha are circulation and open spaces.

AREAS

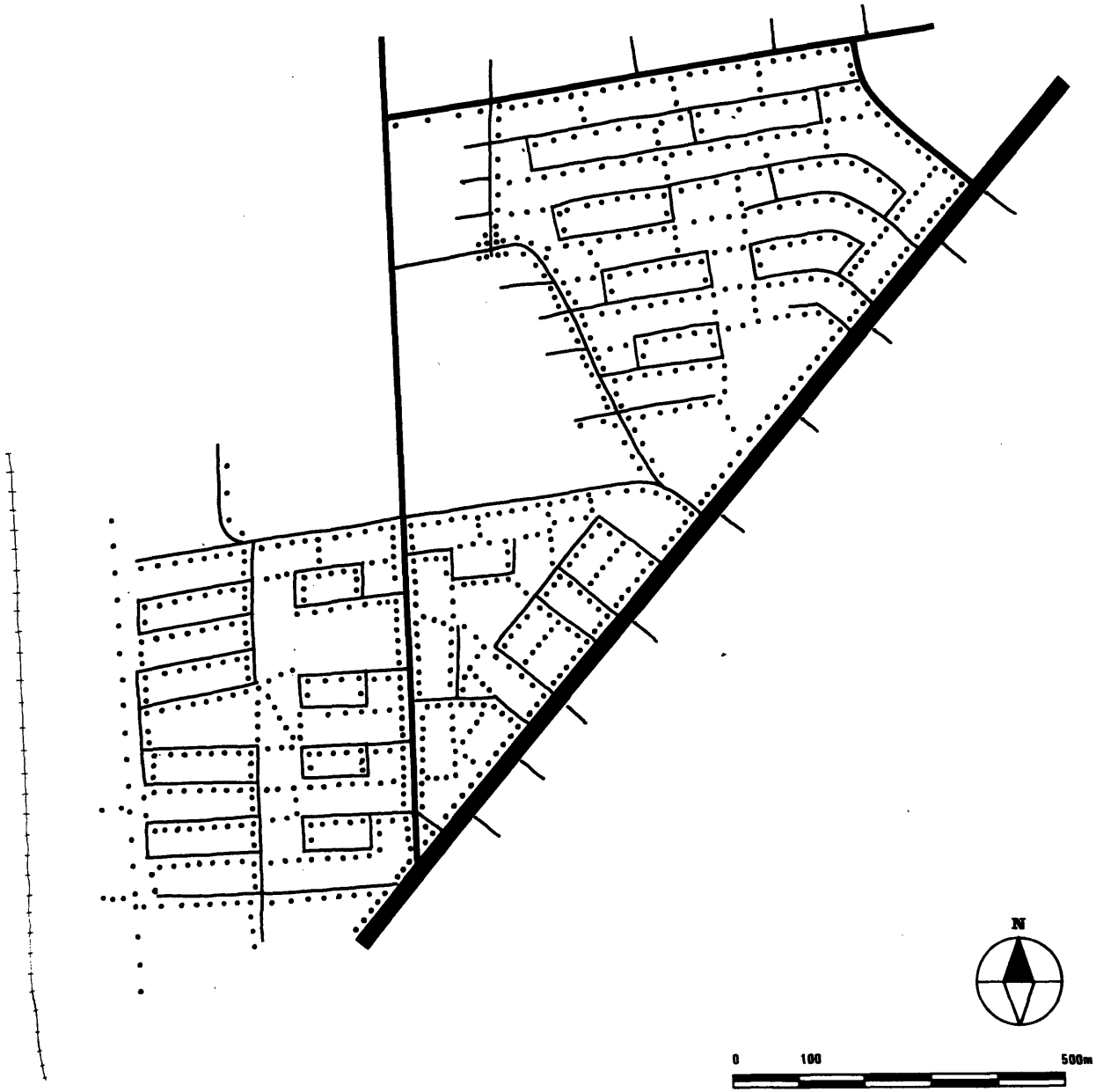
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- OPEN SPACES

KEY

- Pk Parking
- P Police
- F Fire Department
- S School
- Ch Church
- R Recreation
- L Library
- U University
- H Health
- PO Post Office
- SS Social Services
- M Market
- C Cemetery
- Bus
- Rapid Transit

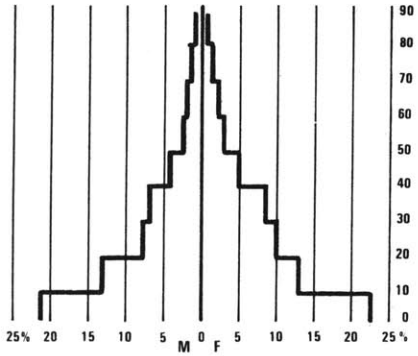
LOCALITY LAND USE PATTERN

CIRCULATION: The grid shows an area planned for very slow vehicular movement since the streets are of semiprivate use. Heavy traffic occurs on the main streets which are those streets on the boundary of the locality and on the 27 Street which bisects the site. Pedestrian circulation occurs all over the site since the number of owners of vehicles in the locality is very small.



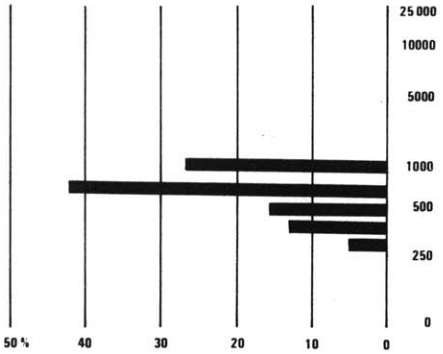
LOCALITY CIRCULATION PATTERN

POPULATION: Of the total population, 67.8 percent were under the age of 20. Males represent 48 percent and females 52 percent of the population.

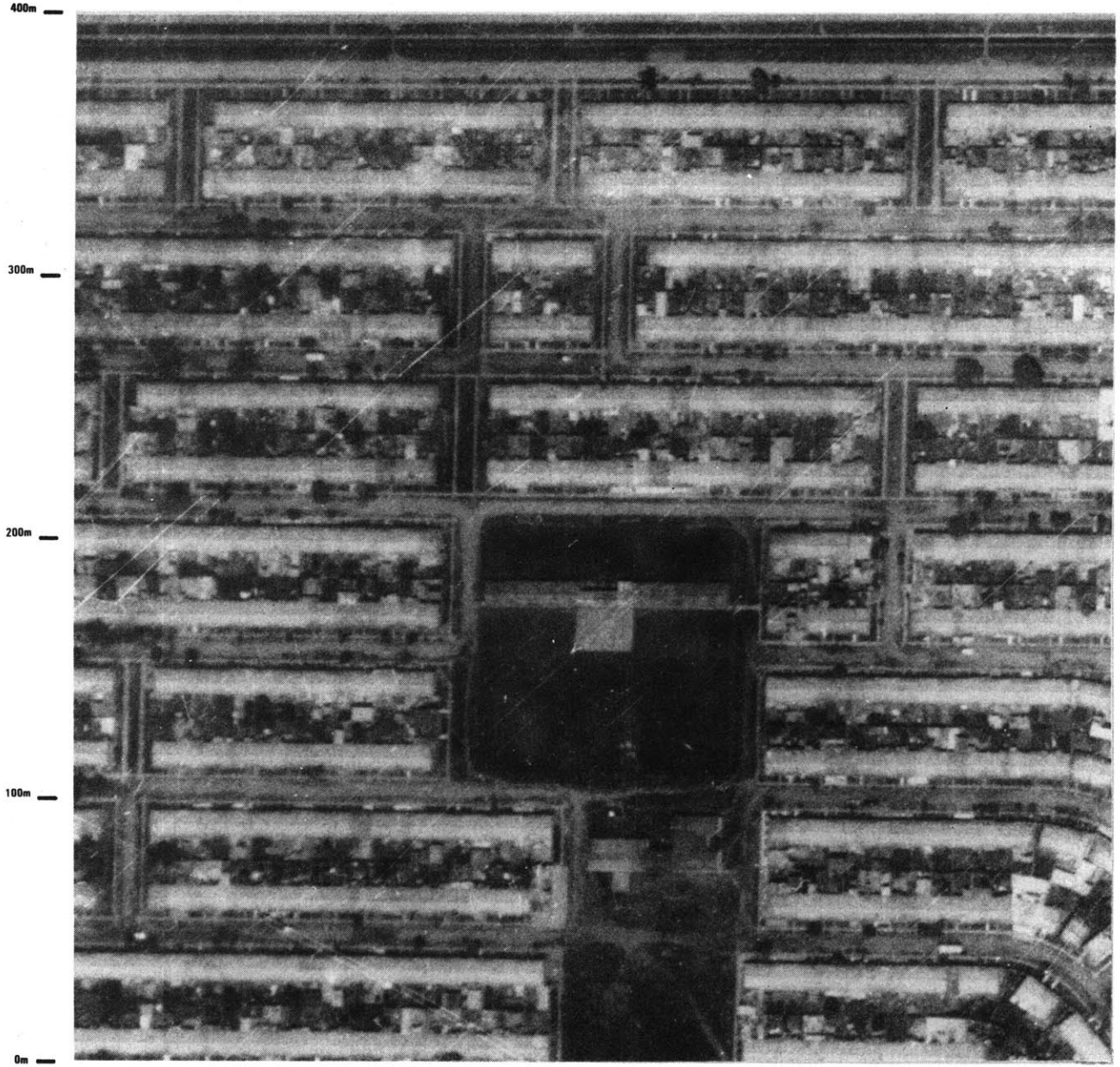


LOCALITY POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Informe Poblacion Instituto de Medicina Preventiva.Cali 1969 U.V.

INCOME: The average household income in 1969 was US $510. This figure represents the income for 32 percent of the population of the Cali Metropolitan Area. 18.8 percent of the household income is used for rent and mortgage.

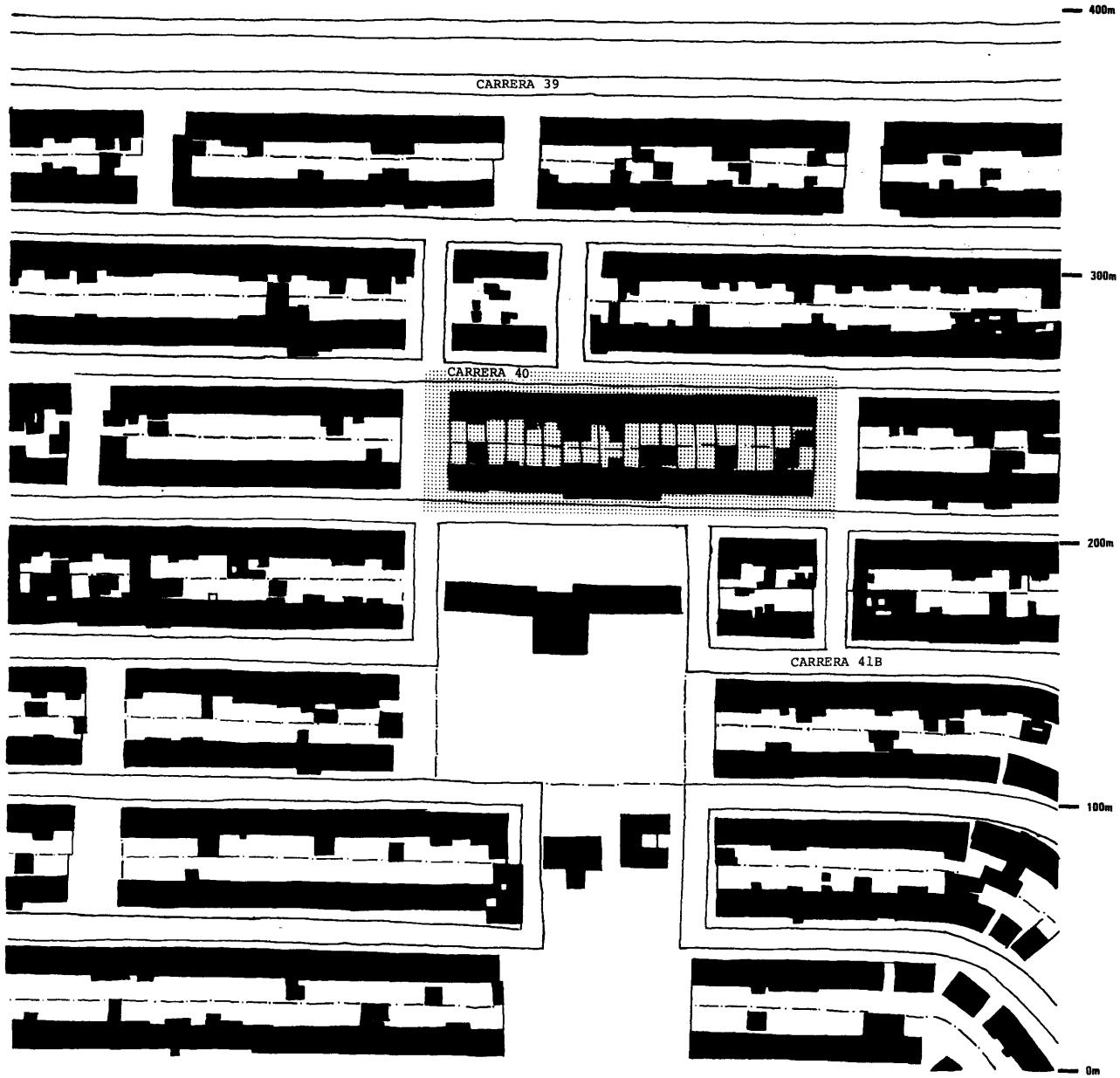


LOCALITY ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Informe Economico Plan General de Desarrollo Cali 1970



LOCALITY SEGMENT AIR PHOTOGRAPH

1:2500



LOCALITY SEGMENT PLAN

1:2500

LOCALITY CONSTRUCTION TYPES

	% 0 — 100	SELF-HELP	ARTISAN	SMALL CONTRACTOR	LARGE CONTRACTOR
SHACK					
MUD/WATTLE					
WOOD					
MASONRY WOOD					
MASONRY CONCRETE	■	■	■		■
CONCRETE					

The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES

WATER SUPPLY	■
SANITARY SEWERAGE	■
STORM DRAINAGE	■
ELECTRICITY	■
GAS	
REFUSE COLLECTION	■
PUBLIC TRANSPORTATION	■
PAVED ROADS, WALKWAYS	■
TELEPHONE	■
STREET LIGHTING	■

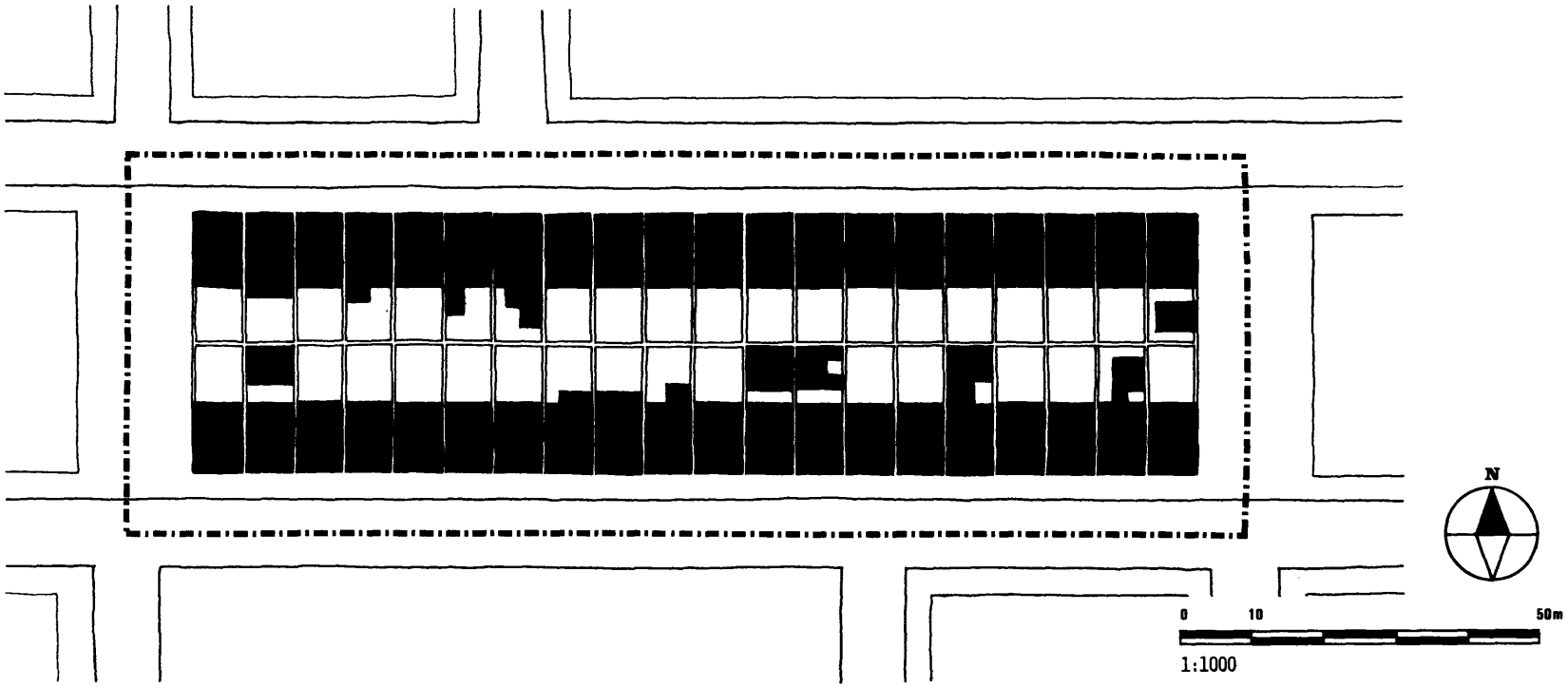
LOCALITY COMMUNITY FACILITIES

POLICE	■
FIRE PROTECTION	
HEALTH	■
SCHOOLS, PLAYGROUNDS	■
RECREATION, OPEN SPACES	■

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

▒ SELECTED BLOCK



LOCALITY BLOCK PLAN

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	40	0.81	49.4
DWELLING UNITS	40	0.81	49.4
PEOPLE	220	0.81	271

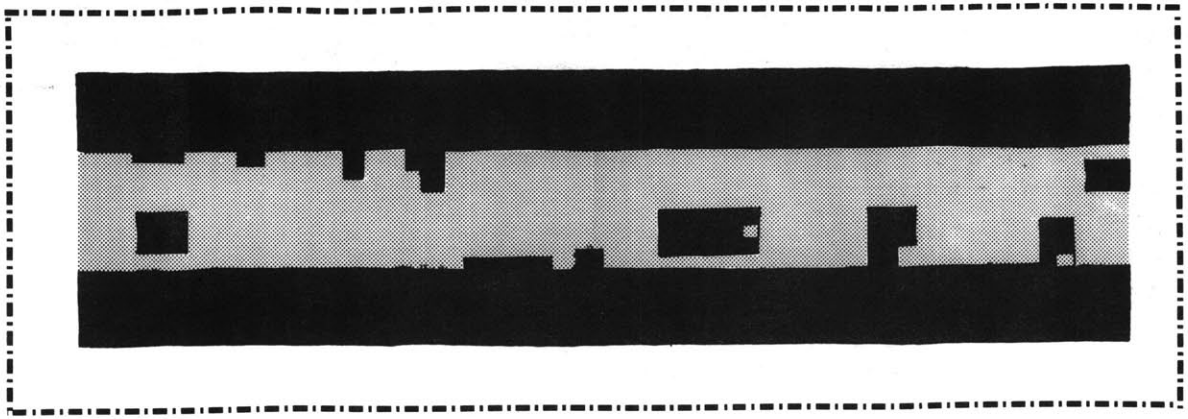
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.30	37
SEMI-PUBLIC (open spaces, schools, community centers)	--	--
PRIVATE (dwellings, shops, factories, lots)	0.51	63
SEMI-PRIVATE (cluster courts)	--	--
TOTAL	0.81	100.00

NETWORK EFFICIENCY

$$R = \frac{\text{network length (circulation)}}{\text{areas served (circulation, lots)}} = 256\text{m/Ha}$$

AVERAGE LOT AREA =

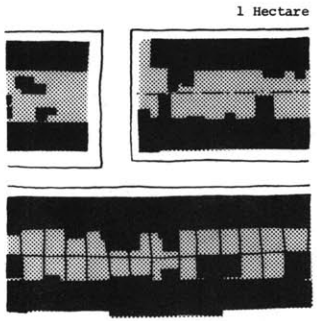
$$\frac{\text{total area (circulation lots)}}{\text{number of lots}} = 202\text{m}^2$$



LOCALITY BLOCK LAND UTILIZATION

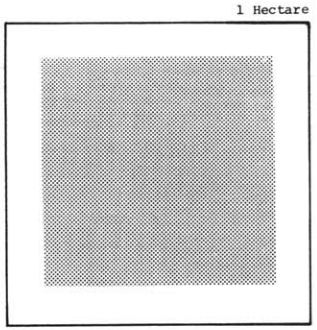
1:1000

LAND UTILIZATION DIAGRAMS



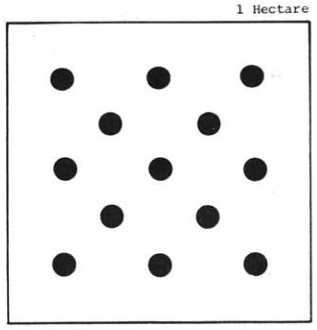
PATTERN

Public:	streets/walkways	
Semi-Public:	playgrounds	
Semi-Private:	cluster courts	
Private:	lots	
	dwellings	



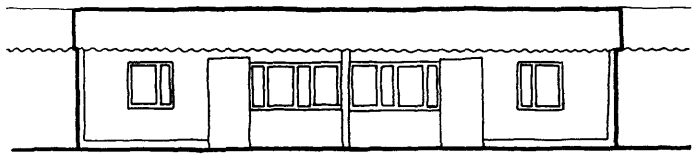
PERCENTAGES

Streets/Walkways	37%
Playgrounds	—
Cluster Courts	—
Dwellings/Lots	63%

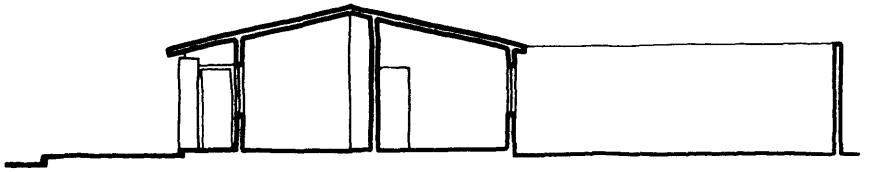


DENSITY Persons/Hectare 271

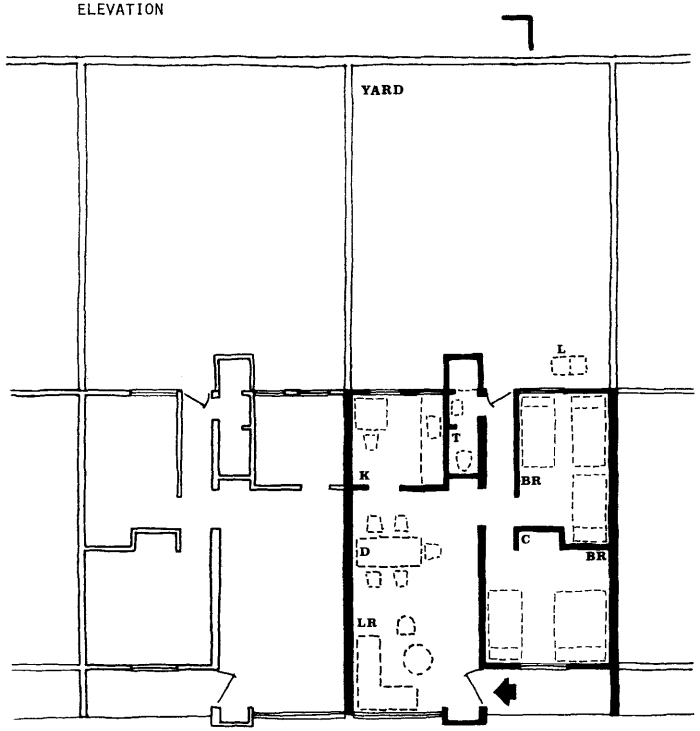
● 20 Persons



ELEVATION

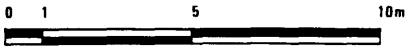


SECTION



STREET

PLAN

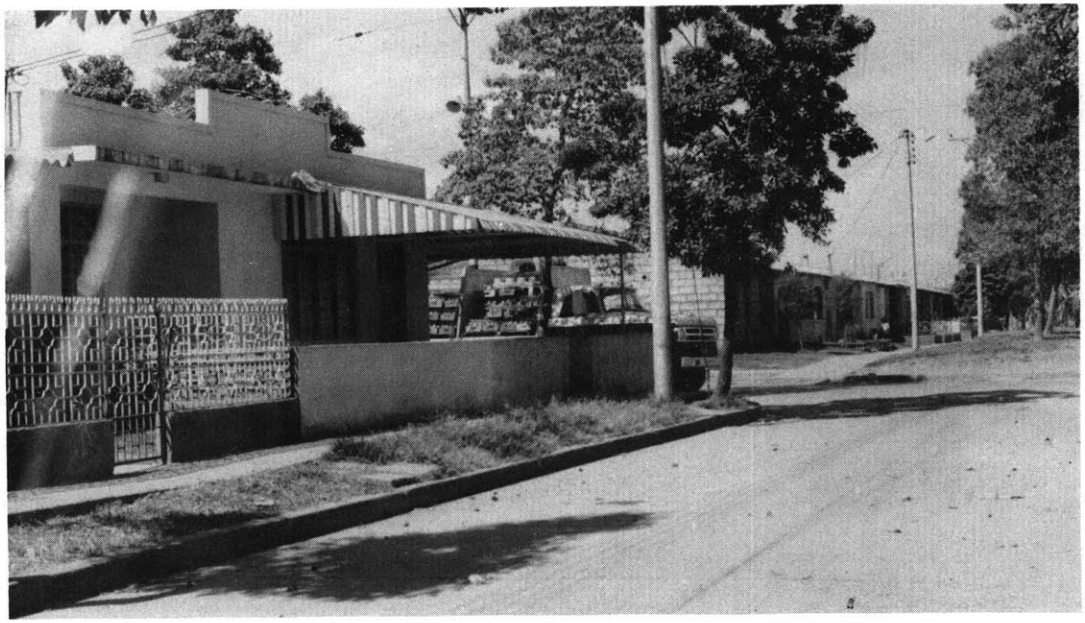


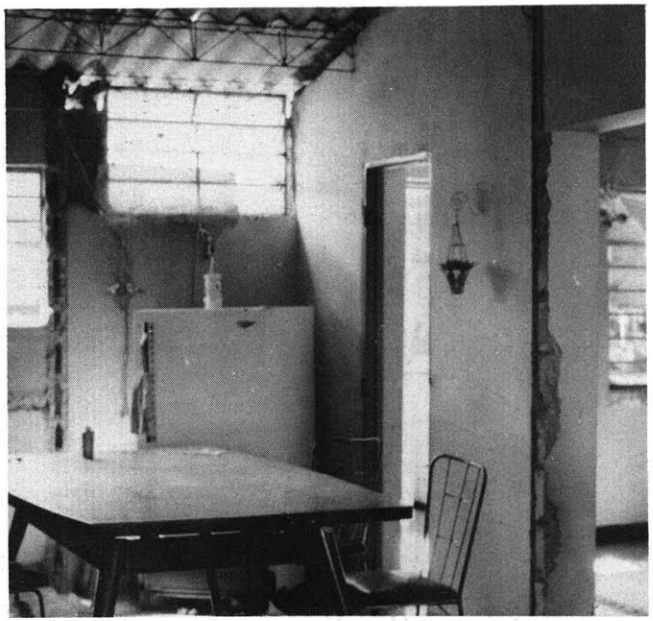
1:200

KEY

LR	Living Room
D	Dining/Eating Area
BR	Bedroom
K	Kitchen/Cooking Area
T	Toilet/Bathroom
L	Laundry
C	Closet
S	Storage
R	Room (multi-use)

TYPICAL DWELLING





PERIQUILLO, Cali: (left) The photograph shows one of the few corner shops adapted for the users. Notice the high percentage of land used for circulation. (right) The view of the dining room shows some partial changes in the interior walls. These changes are made by users who look for more space according to their needs.

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
- type: HOUSE
- area (sq m): 60m2
- tenure: LEGAL OWNERSHIP

LAND/LOT
- utilization: PRIVATE
- area (sq m): 140
- tenure: LEGAL OWNERSHIP

DWELLING
- location: PERIPHERY
- type: ROW HOUSES
- number of floors: 1
- utilization: SINGLE
- physical state: GOOD

DWELLING DEVELOPMENT
- mode: INSTANT
- developer: PUBLIC SECTOR
- builder: ARTISAN & LARGE CONTRACTOR
- construction type: MASONRY
- year of construction: 1966

MATERIALS
- foundation: CUT STONE
- floors: CONCRETE SLAB
- walls: BRICK
- roof: ROMAN TILE

DWELLING FACILITIES
- wc: 1
- shower: 1
- kitchen: 1
- rooms: 3
- other: BACKYARD

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
- user's ethnic origin: COLOMBIANS
- place of birth: VALLE STATE
- education level: INCOMPLETED PRIMARY SCHOOL

NUMBER OF USERS
- married: 2
- single:
- children: 5
- total: 7

MIGRATION PATTERN
- number of moves:
- rural - urban: 1960
- urban - urban: 1
- urban - rural:
- why came to urban area: EMPLOYMENT

GENERAL: ECONOMIC
- user's income group: LOW
- employment: LABOR
- distance to work: 6 TO 15 KM
- mode of travel: PUBLIC TRANSPORTATION

COSTS
- dwelling unit: N.A.
- land - market value: 2.50 US $/m2

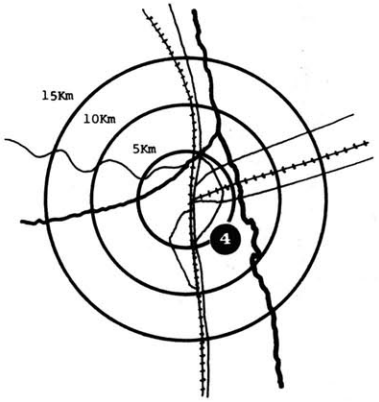
DWELLING UNIT PAYMENTS
- financing: PUBLIC FINANCED
- rent/mortgage: 10 US $/MONTH
- % income for rent/mortgage: 18.8%

LOCALITY SOURCES

- *Plan:* *(accurate) Aerofoto Cali, 1973.*
- *Land Use Pattern:* *(approximate) Field Survey, J. Millan, 1974; P.G.D. Cali.*
- *Circulation Pattern:* *(approximate) Field Survey, J. Millan, 1974.*
- *Segment Plan:* *(approximate) Aerofoto Cali, 1973.*
- *Block Plan:* *(approximate) IBID.*
- *Block Land Utilization:* *(approximate) IBID.*
- *Typical Dwelling:* *(accurate) Field Survey, J. Millan, 1974.*
- *Physical Data:* *(accurate) P.G.D. Cali, 1971-1980.*
- *Socio-Economic Data:* *(accurate) IBID.*
- *Photographs:* *Aerofoto de Cali, Caldas Asociados, 1974; J. Millan, 1974.*
- *General Information:* *P.G.D. 1971, Planeacion Municipal Cali, 1974.*

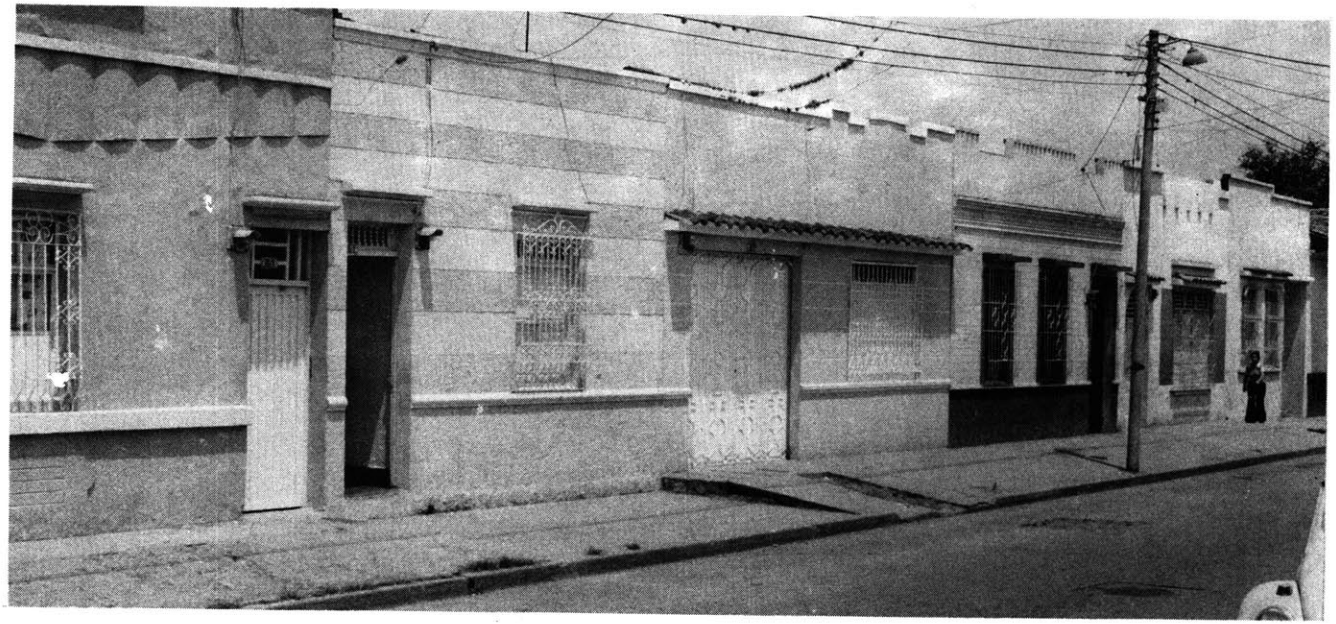
4 TRADITIONAL SYSTEM
Cali

PRIVATE, MIDDLE, MIDDLE LOW, ROW HOUSES.



LOCATION: The Traditional System is composed of several "barrios" distributed more or less in the middle area of the city, surrounded by what we call new urban developments. The locality is about 1 to 1 1/2km from the administrative and commercial center of the city.

ORIGINS: The area represents a higher percentage of dwellings in the city. In this locality we find a variety of social groups: middle, middle-high, middle-low. The Traditional System is also one of the oldest housing areas developed since the area was built between the early 1880s and the 1940s. It was during these years that it reached its maximum development.



TRADITIONAL SYSTEM, Cali: (top) This view shows a representative one-floor, row-house facade. The absence of trees is noticeable. Some of these houses have been adapted for multifamily use.
(bottom) People have changed the traditional roof overhang, an adaptation to the tropical weather of the city, to a flat facade.

LOCALITY PLAN

Today the locality has a population of 110,000 inhabitants. Because of the great demand for housing in the last several years, they are distributed in a system of one-floor row houses, creating a neighborhood of single family dwellings and multi-family dwellings in great quantity.

Because of the locality's limited supply of land and its proximity to the central business district, industry and commerce are forcing people to sell their properties, and new building systems are appearing in the area.

SELECTED SEGMENT

LAYOUT: The traditional system is composed of several of the older barrios in Cali and they constitute, more or less, the nucleus of the city.

The locality is surrounded by new urban developments which have spring up since the 1950's. An important aspect of the layout is that the central business district abuts the locality on its western boundary.

The layout is an orthogonal grid, which is a result of the Spanish influence.

The land subdivision consists of large square and rectangular lots of 7 x 30m approximately. The locality, the city center, and the colonial area made up the 1950's city of Cali.

RBAN DWELLING ENVIRONMENTS

The locality has mixed land use. commercial, industrial, educational, ential activities happening on the ets. On the rest of the locality, s are dispersed, with a very high e of middle, middle-high, and low- dences. Because of its age and be- y a small percentage of the people remodeling their houses, the lo- in a deteriorated condition.

RESIDENTIAL
COMMERCIAL
INDUSTRIAL
OPEN SPACES

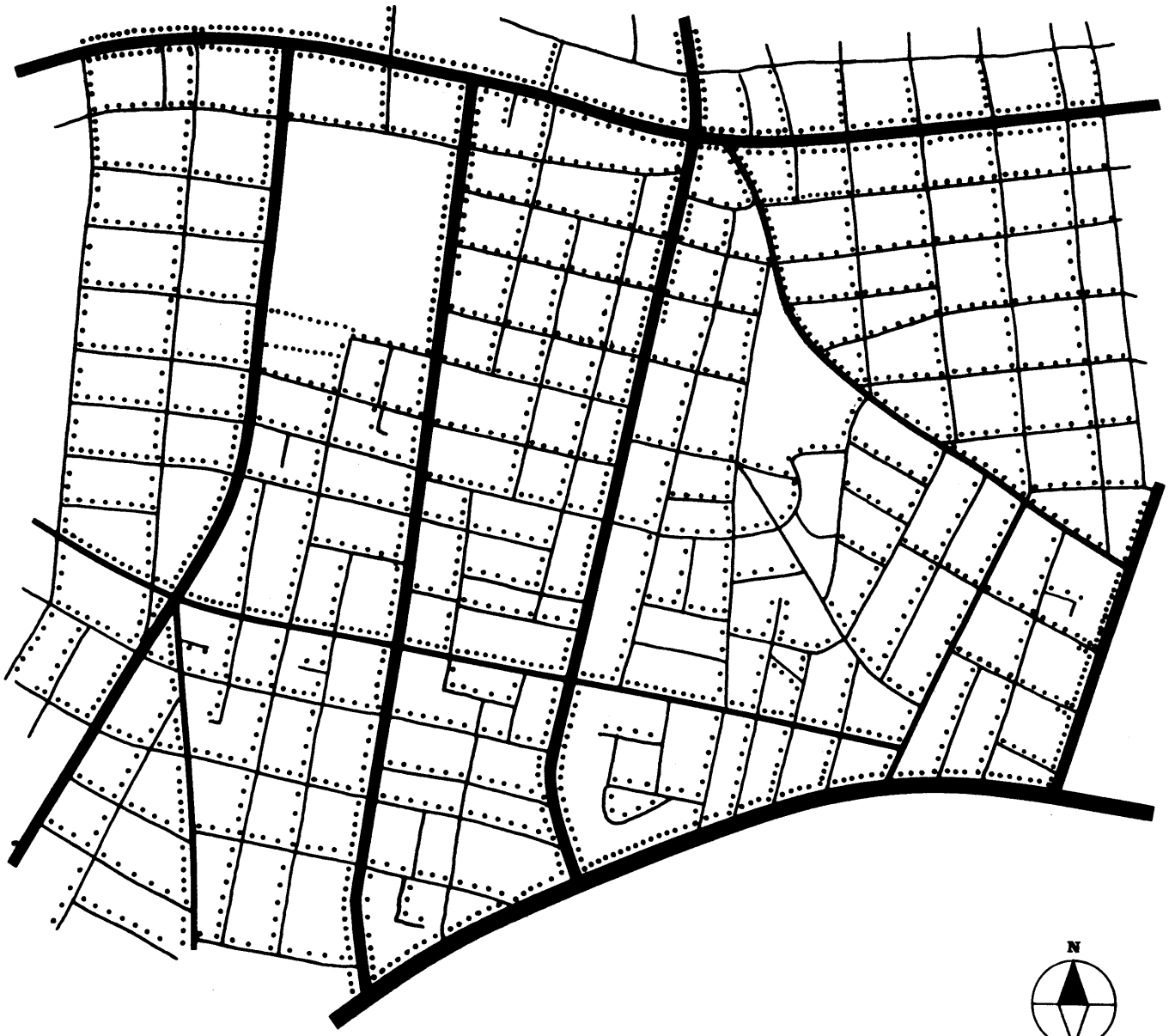
Parking
Police
Fire Department
School
Church
Recreation
Library
University
Health
Post Office
Social Services
Market
Cemetery
Bus
Rapid Transit

0 100

1:10000

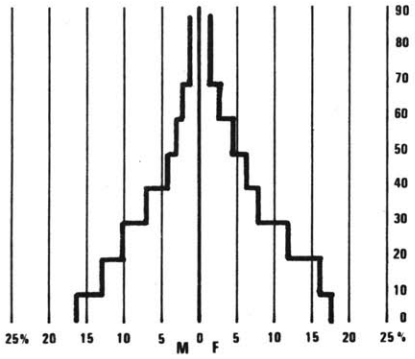
LOCALITY LAND USE PATTERN

CIRCULATION: The whole locality has a high intensity of vehicular and pedestrian circulation. The locality is crossed and bounded by very heavily traveled routes. All streets are paved, and pedestrians normally use sidewalks to move in and out of the locality. In addition, the locality has a good system of public transportation.



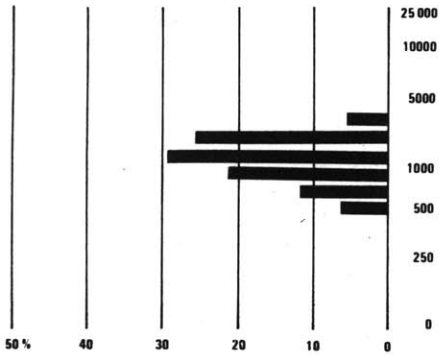
LOCALITY CIRCULATION PATTERN

POPULATION: According to the 1969 Population Sample, of the 109,300 persons in the locality, 60 percent were under the age of 20. Males represent 47 percent and females represent 53 percent of the total population.



LOCALITY POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Informe Poblacion Instituto Medicina Preventiva Cali 1969 U.V.

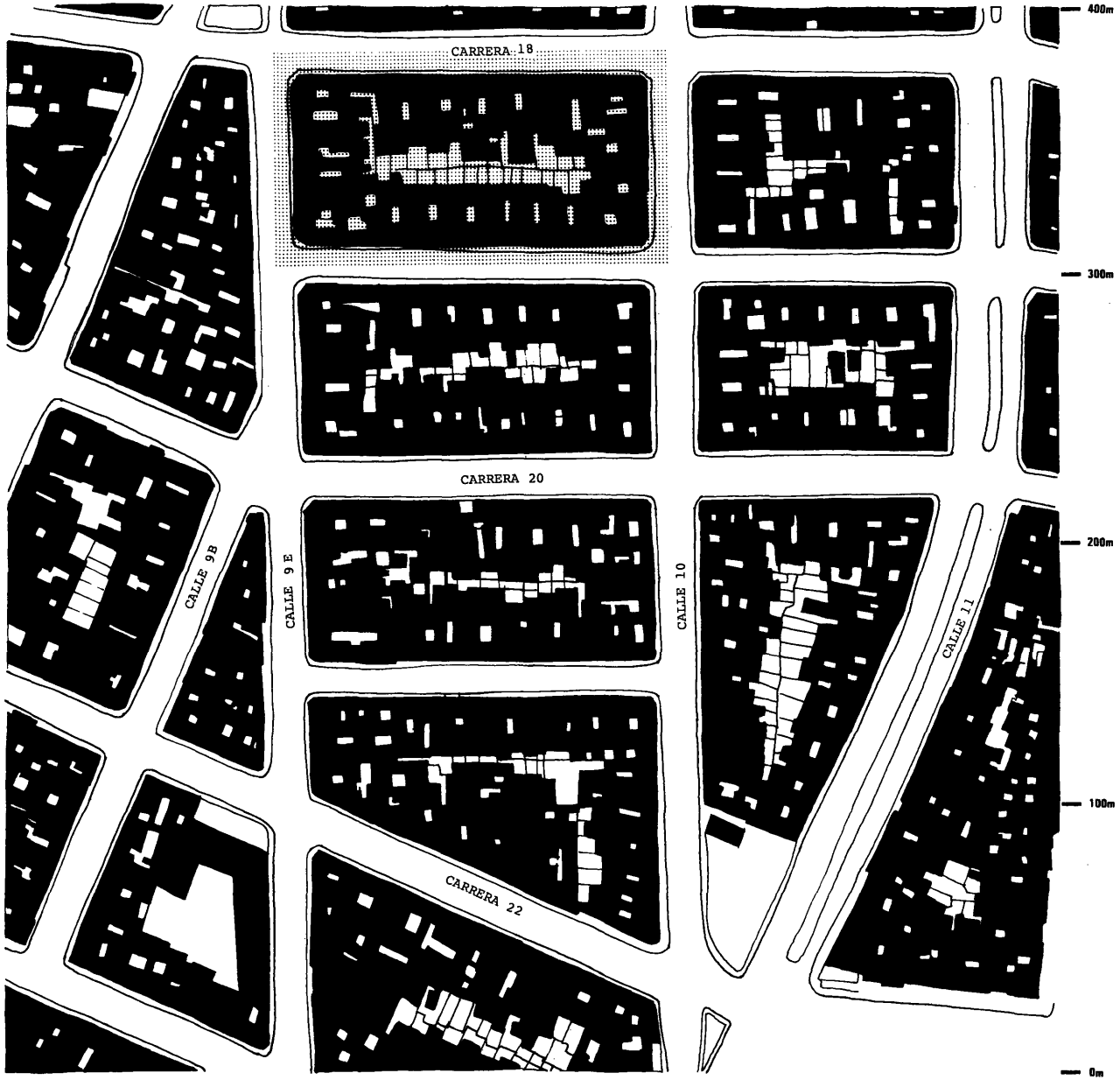
INCOME: The average household income in 1969 was US $1400 to $1600. This figure represents the income of 27 percent of the population of the Cali Metropolitan Area.



LOCALITY ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Informe Economico Plan General de Desarrollo Cali 1970.

LOCALITY SEGMENT AIR PHOTOGRAPH

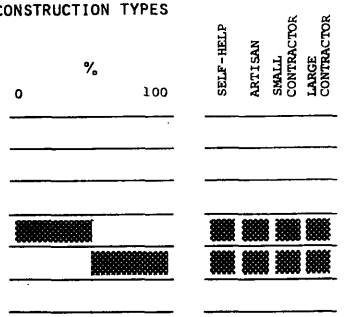
1:2500



LOCALITY SEGMENT PLAN

1:2500

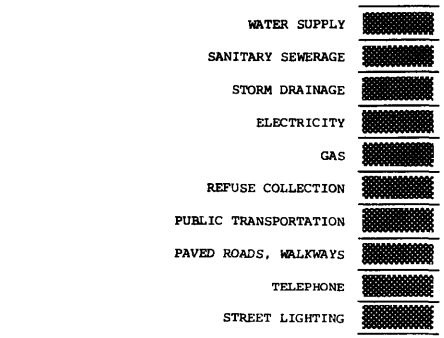
LOCALITY CONSTRUCTION TYPES



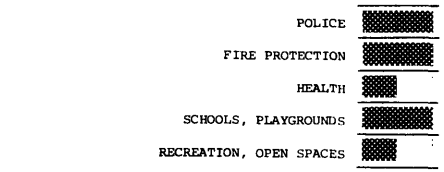
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information:

LOCALITY UTILITIES AND SERVICES



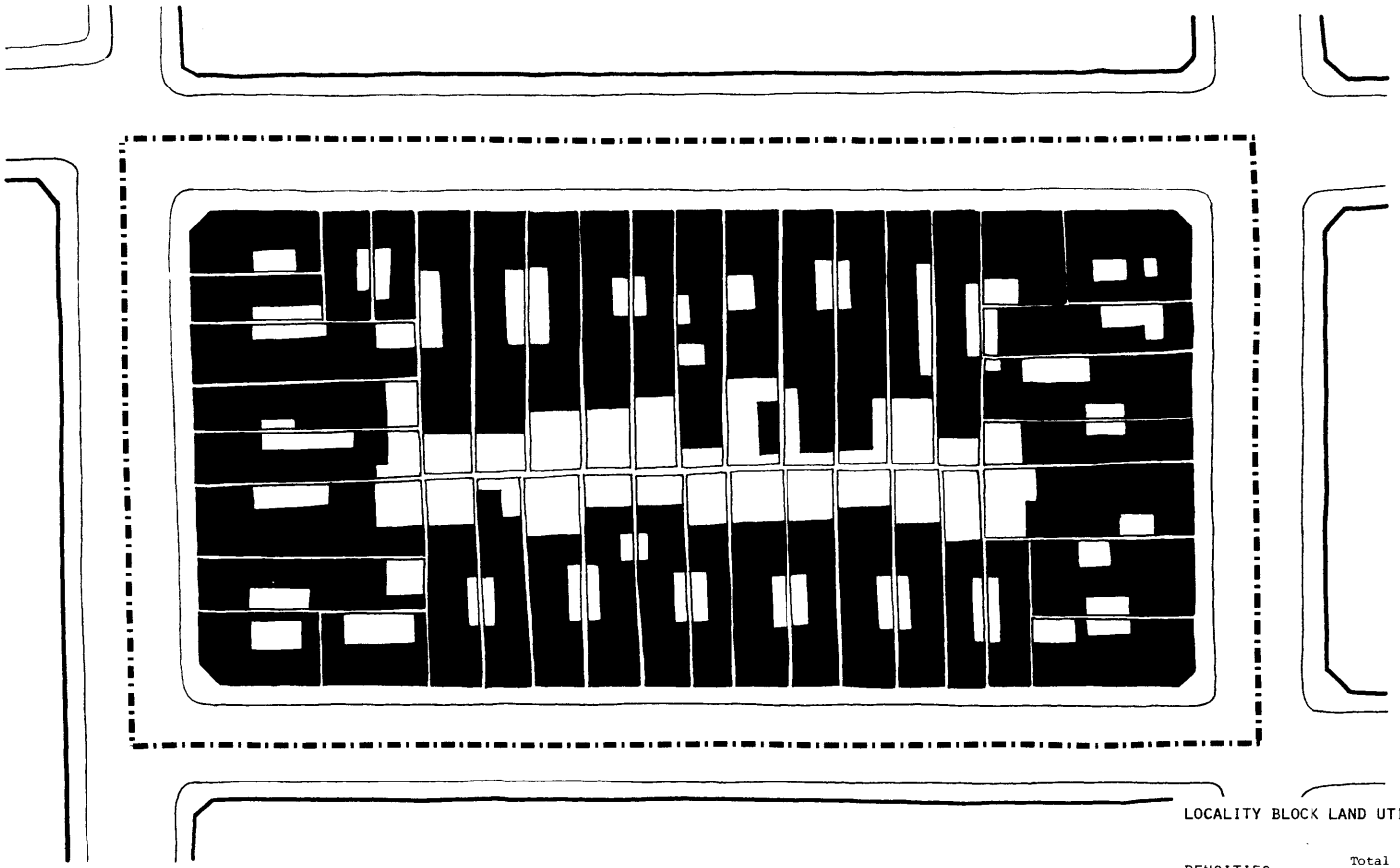
LOCALITY COMMUNITY FACILITIES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information:

SELECTED BLOCK



1:1000

LOCALITY BLOCK PLAN

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	42	1.2	35
DWELLING UNITS	42	1.2	35
PEOPLE	231	1.2	193

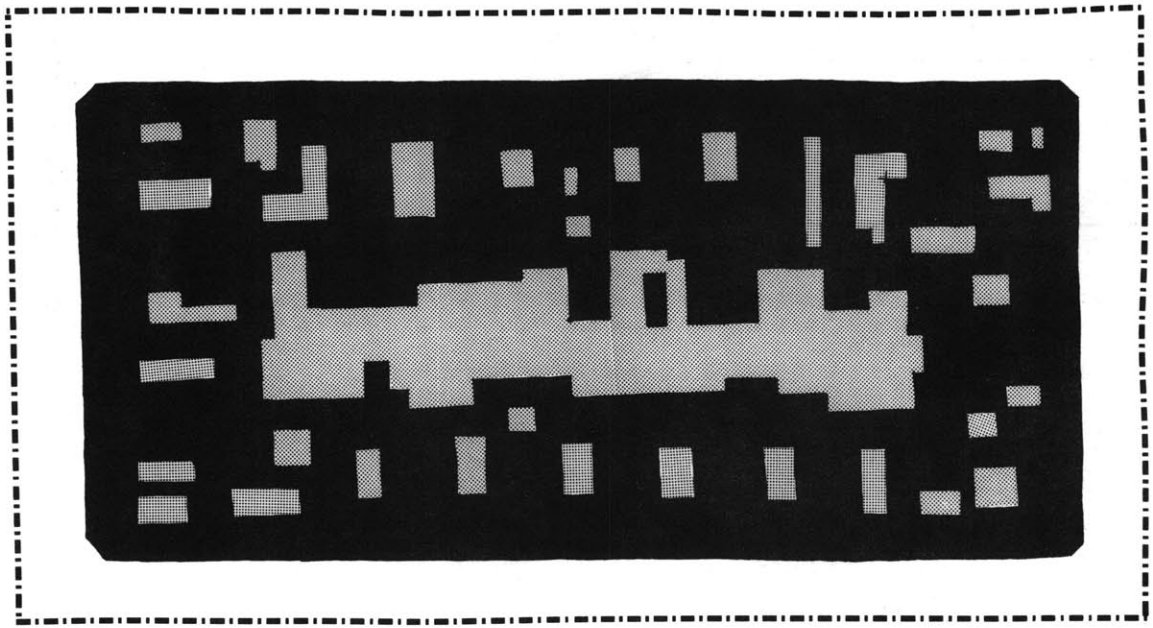
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.36	30
SEMI-PUBLIC (open spaces, schools, community centers)	--	--
PRIVATE (dwellings, shops, factories, lots)	0.83	70
SEMI-PRIVATE (cluster courts)	--	--
TOTAL	1.2	100.00

NETWORK EFFICIENCY

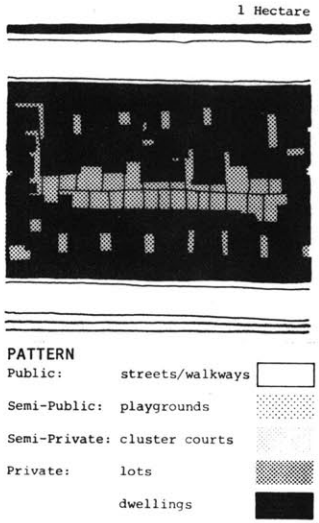
$$R = \frac{\text{network length (circulation)}}{\text{areas served (circulation, lots)}} = 191\text{m/Ha}$$

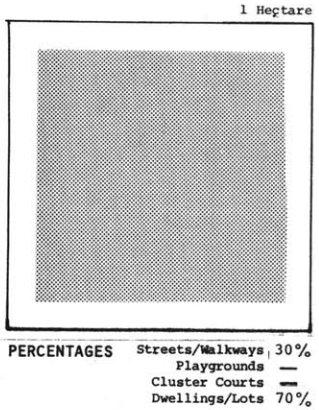
AVERAGE LOT AREA =

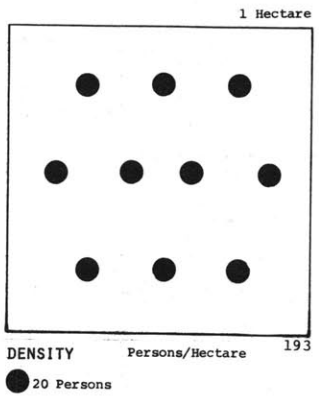
$$\frac{\text{total area (circulation lots)}}{\text{number of lots}} = 285\text{m}^2$$



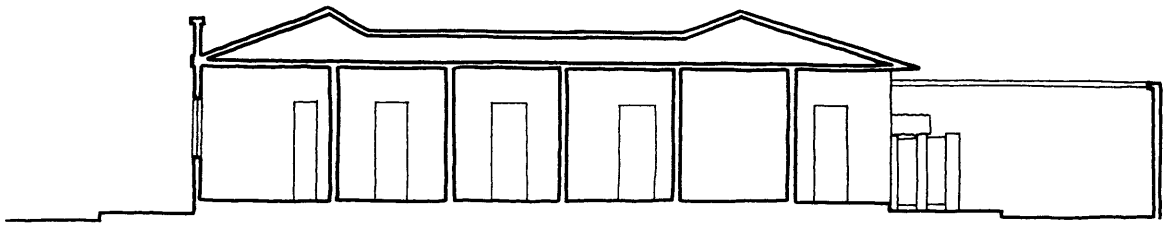
LAND UTILIZATION DIAGRAMS



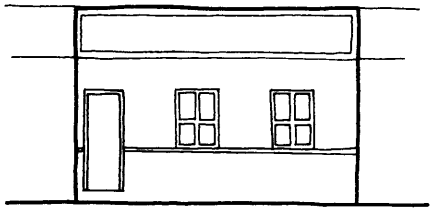




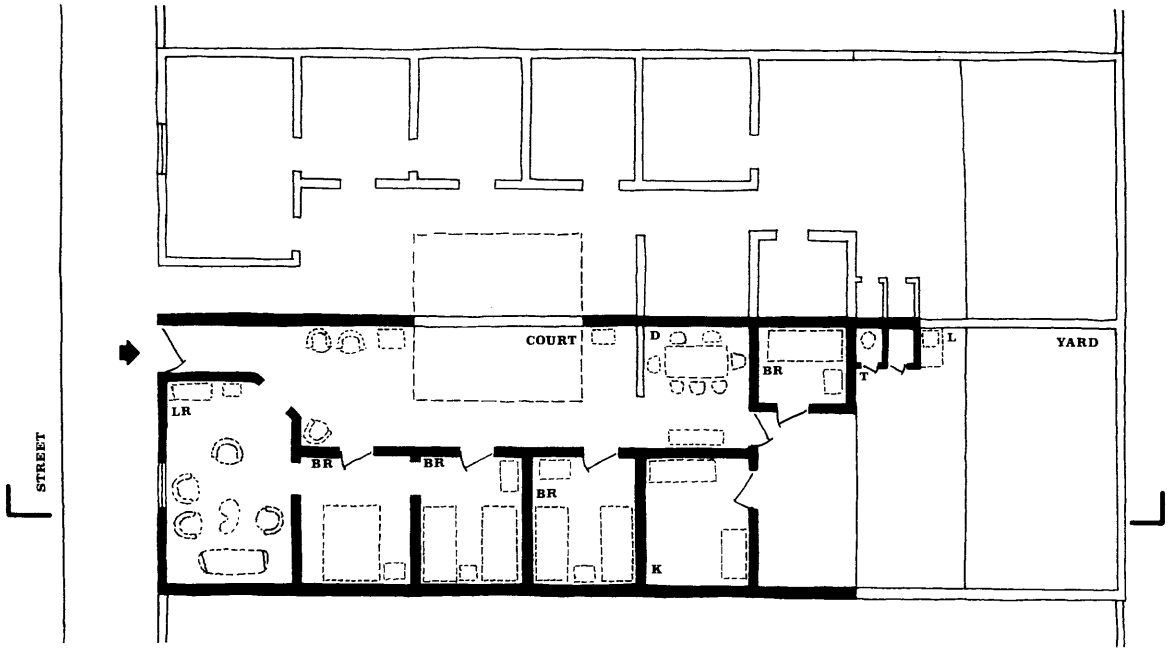
LOCALITY BLOCK LAND UTILIZATION



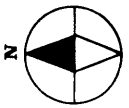
SECTION



ELEVATION

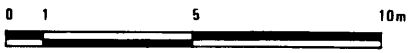


PLAN



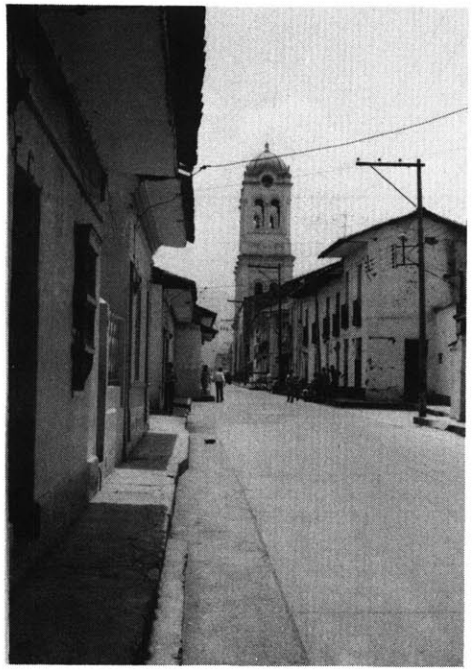
KEY

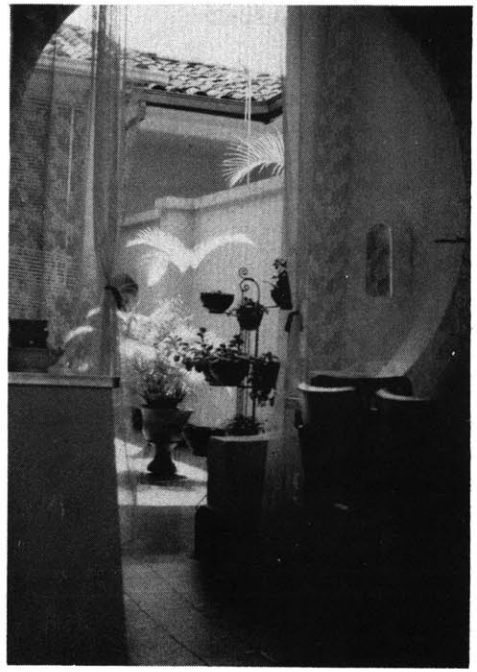
LR	Living Room
D	Dining/Eating Area
BR	Bedroom
K	Kitchen/Cooking Area
T	Toilet/Bathroom
L	Laundry
C	Closet
S	Storage
R	Room (multi-use)



1:200

TYPICAL DWELLING





PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
- type: HOUSE
- area (sq m): 150
- tenure: LEGAL RENTAL/OWNERSHIP

LAND/LOT
- utilization: PRIVATE
- area (sq m): 210
- tenure: LEGAL RENTAL/OWNERSHIP

DWELLING
- location: INNER RING
- type: ROW GROUPED HOUSES
- number of floors: 1
- utilization: SINGLE & MULTIPLE FAMILY
- physical state: FAIR

DWELLING DEVELOPMENT
- mode: INSTANT
- developer: PRIVATE
- builder: SMALL CONTRACTOR
- construction type: MASONRY WOOD CONCRET
- year of construction: 1884-1940

MATERIALS
- foundation: CUT STONE
- floors: BRIC TEILS
- walls: MASONRY ADOBE
- roof: ROMAN TILE

ÆLLING FACILITIES
- wc: 1
- shower: 1
- kitchen: 1
- rooms: 4-5
- other: BACKYARD

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
- user's ethnic origin: COLOMBIANS
- place of birth: CALI
- education level: PRIMARY & HIGH SCHOOL

NUMBER OF USERS
- married: 2
- single: 2
- children: 3-4
- total: 7

MIGRATION PATTERN
- number of moves: 3
- rural - urban:
- urban - urban: 1944
- urban - rural:
- why came to urban area: EMPLOYMENT —EDUCATION

GENERAL: ECONOMIC
- user's income group: MIDDLE
- employment: LABOR
- distance to work: 3 KM
- mode of travel: PUBLIC TRANSPORTATION

COSTS
dwelling unit:
- land - market value: 15 US $/m2

DWELLING UNIT PAYMENTS
- financing: PRIVATE
- rent/mortgage: 40 US $/MONTH
- % income for rent/mortgage: 28 %

TRADITIONAL SYSTEM, Cali: (left) View of a very old street in which the colonial style of houses has been preserved. Few two-story houses exist, and they are used as multi-family dwellings.
(center) View from the backyard in which the kitchen, toilet, shower, and laundry are usually set.
(right) This interior view shows the court yard which gives light and ventilation to the bedroom and the dining room. These houses, usually 3.50m in height, are kept fresh and comfortable by the courtyard and the tile Roman roof.

LOCALITY SOURCES

Plan:	*(accurate) Aerofoto Cali, 1973.*
Land Use Pattern:	*(approximate) Field Survey, J. Millan, 1974; P.G.D. Cali.*
Circulation Pattern:	*(approximate) Field Survey, J. Millan, 1974.*
Segment Plan:	*(approximate) Aerofoto Cali, 1973.*
Block Plan:	*(approximate) IBID.*
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Typical Dwelling:	*(accurate) Field Survey, J. Millan, 1974.*
Physical Data:	*(accurate) P.G.D. Cali, 1971-1980.*
Socio-Economic Data:	*(accurate) IBID.*
Photographs:	*Aerofoto de Cali, Caldas Asociados, 1974; J. Millan 1974.*
General Information:	*P.G.D. 1971, Planeacion Municipal Cali, 1974.*

EVALUATIONS

PHYSICAL DATA MATRIX

Category	Population per Category	% of Total Population	LOCALITIES	5 Income	6 Type	7 Area	8 Tenure	9 Rent/Mort.	10 Utilization	11 Area	12 Tenure	13 Location	14 Type	15 No. Floors	16 Utilizat'n	17 Phy. State	18 Mode	19 Developer	20 Builder	21 Construction Type	22 Date	23 Den.	Locality
				Very Low / Low / Moderately Low / Middle / High	Shanty / Room / Apartment / House	$50m^2$ or less / 51 - 100m^2 / 101m^2 or more	Legal Rental / Legal Ownership	20% or less of income / 21% or more of income	Public / Semi-Public / Private	m^2	Extralegal: rental / Extralegal: ownership / Legal: rental / Legal: ownership	City Center / Inner Ring / Periphery	Detached / Semi-Detached / Row/Group / Walk-up / High-rise	1 / 2 / 3 or more	Single / Multiple	Bad / Fair / Good	Incremental / Instant	Popular / Public / Private	Self-Help / Artisan / Small Contractor / Large Contractor	Shack / Mud and Wattle / Wood / Masonry/Wood / Masonry/Concrete / Concrete	Year of Construction	People/Ha	
			1. SILOE							25-80											1950	372	1
A	266.541	24.6	2. UNION DE VIVIENDA POPULAR							140											1965	213	2
B	534.740	48	3. PERIQUILLO							140											1966	271	3
C	206.291	19	4. TRADITIONAL SYSTEM							210											1884	193	4
			5. SAN FERNANDO							240											1945	100	5
D	61.912	5.6	6. TEQUENDAMA							200											1966	160	6
			7. SAN VICENTE							210											1960	160	7
E	30.515	2.8	8. SANTA MONICA							250											1958	160	8
	1.100.000	100.0	Total																				

The physical data of the 4 case studies of dwelling environments existing in Cali Metropolitan Area is summarized in the physical data matrix and in the following comments. The matrix permits: a) a comprehensive view of the spectrum of dwelling types; b) a comparison and determination of trends and patterns.

Cases 5,6,7, and 8 have been included in the chart, in addition to the other four cases, to provide a comprehensive view of the urban area's dwelling types.

1) CATEGORY

2) POPULATION PER CATEGORY: Number of people

3) PERCENT OF TOTAL POPULATION

4) NAME OF THE LOCALITY. The 4 case studies have been grouped in 3 categories, identifying different income groups, housing systems, and selected physical characteristics. The 3 categories were identified as follows:

Category/Income	Dwelling Unit Type
A Very Low	Shanty-Room
B Low & Low/Middle	House-Room/Apt.
C Middle & Middle/Low	House

Category A represents the 24.6 % of population.
Category B represents 48% of the population.
Category C represents 19% of the population.
The rest of the population are middle-high and high income groups.

5) USER INCOME GROUP The income level is a basic indicator in the expected pattern: the higher the income, the higher is the level of the indicator. The housing situation has a direct relationship to income level. We find a range of materials and area which goes from $20m^2$ and a cardboard structure to $300m^2$ and more of a variety of expensive materials, services, and comforts.

6) DWELLING UNIT TYPE: Four types of dwelling units are considered: Shanty, Room, Apartment, and House. The pattern is defined in terms of income groups: Shanty: very low incomes; Room: very low and low incomes; Apartment: low and middle low incomes; and House: moderately low and middle incomes.

7) DWELLING UNIT AREA: Three different ranges are considered: a) from $25m^2$ to $80m^2$; b) from $80m^2$ to $140m^2$; c) from $140m^2$ to $210m^2$ or more. In the low income groups, usually the dwelling consists of one room or one incomplete house, while in the higher income groups, a complement of spaces in the dwelling is provided. The dwelling unit areas range from $25m^2$ (Siloe: 1 room) to a high of $210m^2$ (traditional: 3 bedrooms, living room, dining room, bathroom, kitchen, courtyard, and backyard/patio).

8) DWELLING UNIT TENURE: In the very low and low income groups, three different situations can be defined: a) extralegal ownership, typical of th squatter settlements (Siloe); b) rental, characteristic of those groups who are moving continuously into the urban area.

in search of land opportunities and those families who have emigrated from the country to the city; and c) legal ownership, where tenants build their houses incrementally or with the assistance of the government.
In the middle low and middle income groups, two situations can be found: legal and rental. Middle groups generally own their houses by using credit provided for private agencies. A rental situation is characteristic of all those families with no possibilities of being able to afford a house.

9) DWELLING UNIT PERCENT INCOME FOR RENT: From the case studies we can see a significant difference between the lower income groups and the middle and middle income groups. We have: very low and low spending 13.6 to 15.4%; middle/low spending 18.8%; and middle low and middle spending 28.0%.

10) LAND/LOT UTILIZATION: In the very low and low income (Siloe), they are crowded in a room or in a shanty. For this reason, the land around the shelters becomes essential for all daily activities. Some times these areas are of private or semiprivate use depending on the location of fences, but in both cases, users have control of the land.
In the other case studies, because of the land subdivision (grid), users have complete control of their land. (Periquillo Traditional and Union de Vivienda Popular)

11) LAND/LOT AREA: Lot boundaries were impossible to define in the locality of Siloe, therefore, the lot area is not measurable.

In the other three localities, the land/lot area ranges from 140m^2 (Periquillo and Union de Vivienda Popular) to 210m^2 (Traditional).

12) LAND/LOT TENURE: Extralegal tenure is found in very low income groups, especially in squatter areas such as Siloe. The legal/rental situation appears in small proportion in the low and low middle groups. Legal ownership is the most common situation in the three different categories analyzed.

13) DWELLING LOCATION: The majority of low income groups are found in the inner ring, surrounded by the middle, middle high, and high income groups. A recent migration of the rich people away from the city center means the high income groups are found on the periphery.

14) DWELLING TYPES: Detached and semi-detached dwelling types are found in very low and high income groups. The difference between these two types is simple: first, the size of the land/lot area; and second, the quality of houses and services.

The higher percentage of the built-up area of the city is represented by row-grouped houses.

Walk-up apartments and high-rise apartments are built by developers, and they belong mainly to high income families.

15) DWELLING FLOORS: Most dwellings in Cali's metropolitan area are generally single floor units regardless of income levels.

For example, walk-up apartments are found in a government project and a few private projects. These house a very low percentage of the population.

High-rise units are built on a very limited scale and available to the very high income groups.

16) DWELLING UTILIZATION: Single utilization is a characteristic form of dwelling in the different case studies, but because of the high demand for dwelling and shelter, the multiple use of houses is rising rapidly.

Naturally, it is the low and middle low income groups who are forced into multiple utilization of houses.

17) DWELLING PHYSICAL STATE: The pattern of physical states is clearly defined: poor conditions are found in the very low and low income groups; fair conditions are found in the middle low, middle, and low middle groups; and good conditions are found in the middle high, high and very high income groups.

18) DWELLING DEVELOPMENT MODE: The incremental mode of development is very characteristic of the very low, low and moderately low income levels. The localities of Siloe and Union de Vivienda Popular conform to the pattern. Instant development is mainly found in the middle high, high, and very high income groups. This is a result of the availability of financial credit mainly by private agencies and construction companies.

19) DWELLING DEVELOPER: The popular developer builds for the very low and low income levels. These groups have no alternative because they lack financial resources or access to the resources of private, commercial, and public institutions.

The public sector has built walk-up apartments for the middle income, but these apartments have been occupied by the middle high and high income groups. The public sector has built row-houses for the low income (case of Periquillo) with the participation of the community.

Private development is found for the middle, middle high, and high income levels

20) DWELLING BUILDER: The very low and low income groups build their own shelter or house, and usually they have the assistance of artisans (Siloe and Union de Vivienda Popular). Generally government projects are built by large contractors.

The small contractor is used mainly by the middle and high income groups and occasionally by the very high income group. Large contractors usually build housing systems for the private and commercial agencies who have access to the banks and financial agencies.

21) DWELLING CONSTRUCTION TYPE: A clear situation can be identified in construction types: the lower the income group, the less permanent the construction; and the higher the income, the more permanent the dwelling construction.
In the very low and low income groups, shacks are common.
Masonry/concrete is the most typical dwelling construction type in the city.
Concrete is used in large housing projects for the very high and high income groups (high-rise apartments mainly).

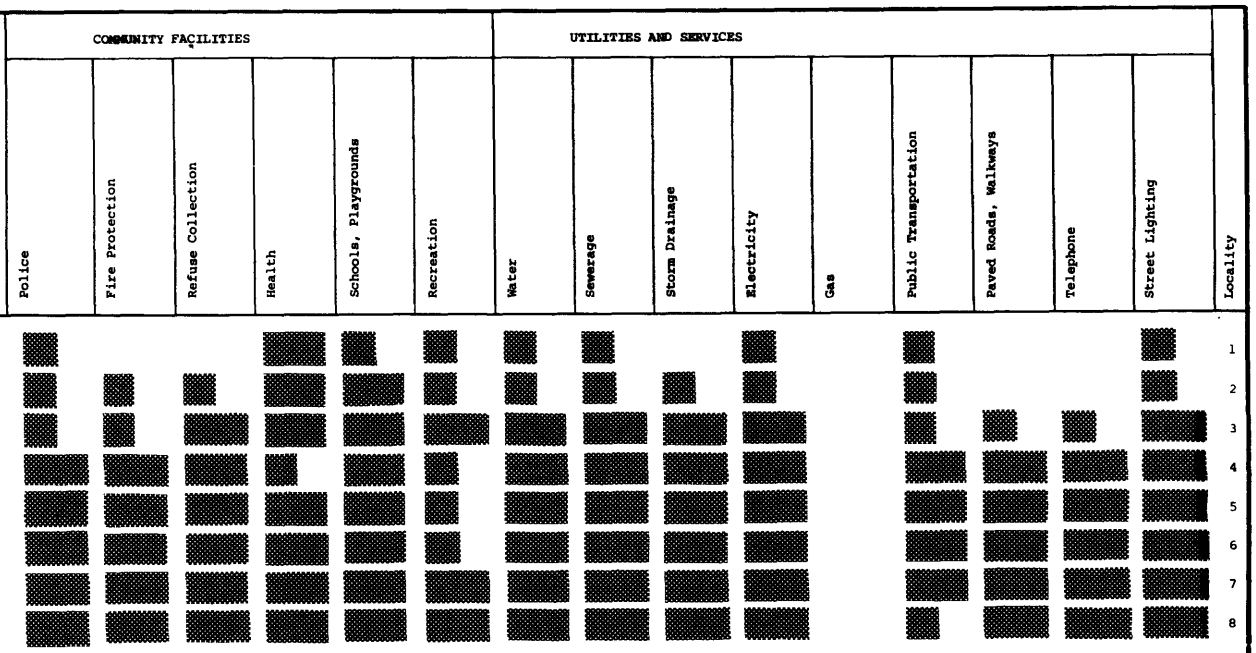
22) DWELLING DEVELOPMENT- YEAR OF CONSTRUCTION: The oldest of the cases studied is the traditional system, located in the inner ring, close to the city center and built in 1885. The newest case studied is Periquillo, a government project built in 1966-1968.

23) DWELLING DEVELOPMENT- DENSITY: Population densities are intended as indicators for each dwelling group. Therefore, samples were taken from selected, small, homogeneous areas that include the land of a group of dwellings and their circulation access.
There is a clear correspondence between density and income group: lower densities characterize middle and middle low income groups; higher densities characterize low income groups.

Lower densities correspond to houses. Higher densities correspond to shanties and row houses.

COMMUNITY FACILITIES. UTILITIES/SERVICES MATRIX

Category	Population per Category	% of Total Population	LOCALITIES
			1. SILOE
A	266.541	24.6	2. UNION DE VIVIENDA POPULAR
B	534.740	48	3. PERIQUILLO
C	206.291	19	4. TRADITIONAL SYSTEM
			5. SAN FERNANDO
D	61.912	5.6	6. TEQUENDAMA
			7. SAN VICENTE
E	30.515	2.8	8. SANTA MONICA
	1.100.000		Total



The matrix shows the approximate availability of community facilities and services in the 4 dwelling environments.

Three levels are indicated as follows:

- No provision at all
- Limited or occasional
- Adequate or normal

Cases 1, 2 rate "None" and "Limited". These two cases are from the very low and low income groups. They represent generally 24.6% of the population in Cali.

Case 3 rates "Limited" and "Adequate". These cases belong to the middle low income groups. In this case represents a government housing project with a population of 7,754 inhabitants.

Case 4 rates "Adequate". These cases are from the middle and middle low income levels, comprising about 110,000 inhabitants.

Cases 5,6,7, and 8 have been placed within the chart to provide a better understanding of the availability of an urban area's facilities and utilities/services in order compare the availability of these services to income level. These four cases represent 8.5 percent of the urban population.

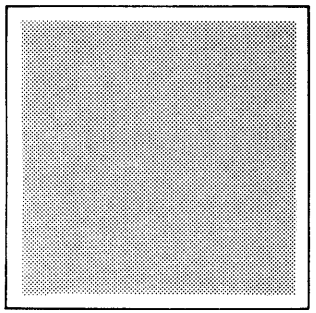
Cases 5 and 6 rated "adequate". These cases are from the middle and middle high income sectors whose locations are in the inner ring.

Cases 7 and 8 rated "adequate". These cases are from the middle high and very high income sectors whose locations are in the inner ring.

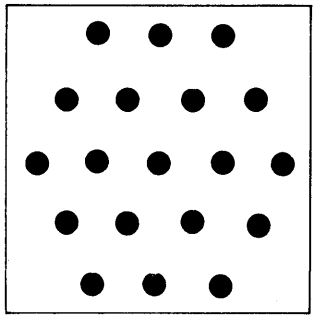
LAND UTILIZATION: PATTERNS, PERCENTAGES, DENSITIES

1 SILOE

Popular: Shanties, Rooms, Houses
% land for public circulation low
% semiprivate land none
% private land high
population density medium
land for public open spaces none
Very poor living conditions. Settlers are unable to pay for utilities and services



PERCENTAGES Streets/Walkways 14%
Playgrounds —
Cluster Courts —
Dwellings/Lots 86%

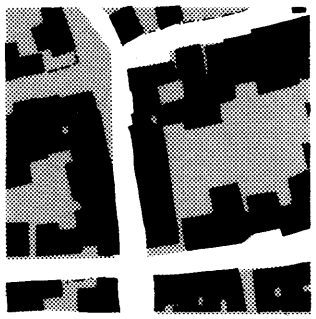


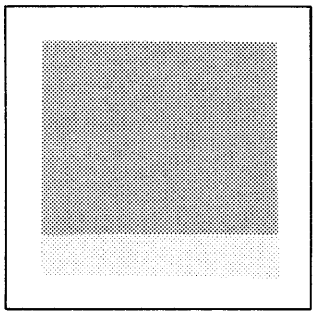
DENSITY Persons/Hectare 372

20 Persons

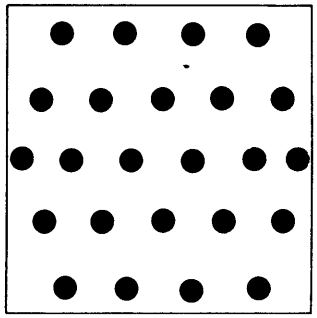
1B SILOE

Popular: Shanties, rooms, houses
% land for public circulation medium
% semiprivate land medium
% private land acceptable
% land for public open spaces none
population density very high
dwelling unit density high
Very poor living conditions. No similar cases.





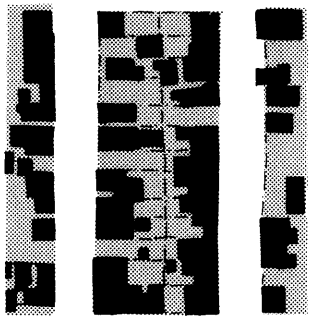
32%
—
16%
52%

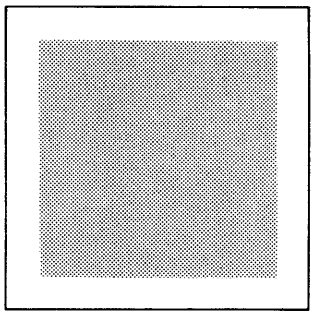


512 P/Ha

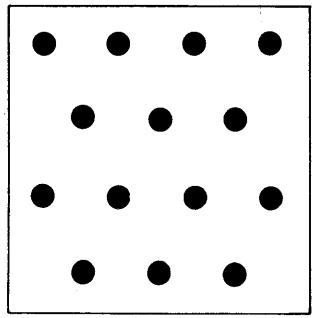
2 U.V.P.

Popular: low income row houses
% land for public circulation medium to high
% semiprivate land none
% private land medium
% land for public open spaces acceptable
population density low
Poor layout with excessive public land; low living conditions.





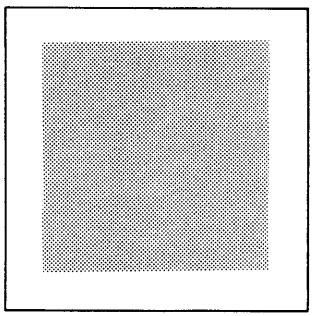
35%
—
—
65%



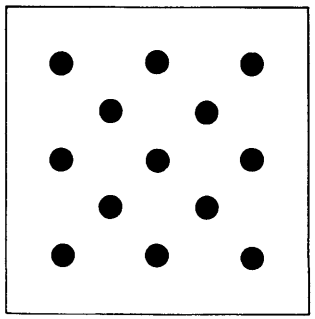
213 P/Ha

3 PERIQUILLO

Public low income row houses
% land for public circulation medium to high
% semiprivate land none
% private land medium
% land public open spaces acceptable
population densities low
Layout with excessive public land and undefined open space. Similar cases: 2 and 3.



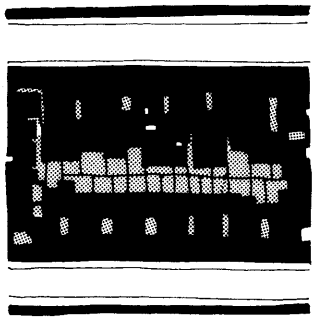
37%
—
—
63%

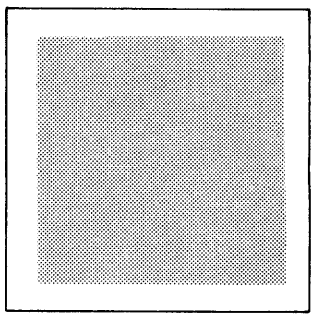


271 P/Ha

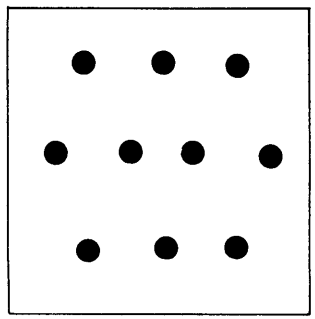
4 TRADITIONAL

Private middle income row houses
% land for public circualtion medium
% semiprivate land none
% private land high
% land public open spaces very poor
population densities very low
Typical colonial Spanish layout: big lots and low population density.





30%
—
—
70%



193 P/Ha

LAND UTILIZATION: OPTIMUM RANGES

The three graphs shown are used to evaluate and to compare the case studies in terms of LAND UTILIZATION PERCENTAGES and RESIDENTIAL POPULATION DENSITY.

Land utilization percentages are computed for the following areas: a) PUBLIC: streets, walkways, open spaces; b) SEMI-PUBLIC: open spaces; c) PRIVATE: dwellings, lots.

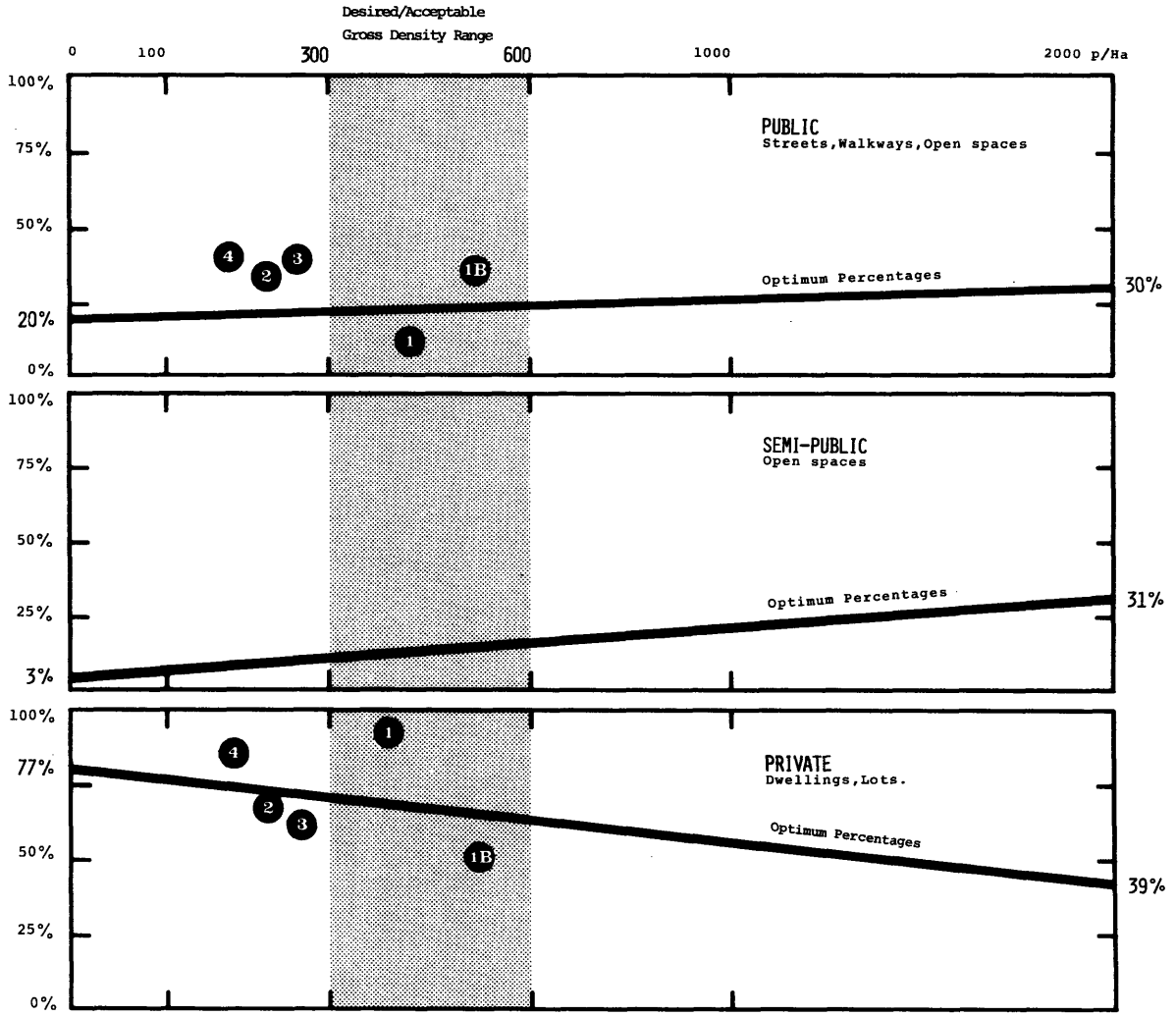
Residential population density is the total number of persons per unit hectare. The range of desired/acceptable densities is 300 persons per Ha to 600 persons per Ha, based upon case studies and accepted zoning standarts in different urban contexts in developing countries. This range can be achieved assuming that the dwelling development is of 1-3 stories, with an average built-up area of 10-20 m^2 per persons and 30-35 percent of land/lot coverage.

KEY
VERTICAL SCALE: Land utilization percentages (0 to 100%).
HORIZONTAL SCALE: Residential population density (0 to 2,000 persons per Ha shown on logarithmic scale).
CURVE: Range of optimum land utilization percentages (optimum values vary for different densities based upon case studies and accepted zoning standards in different contexts).
SHADED AREA: Desired/optimum efficiency of land utilization (the intersection of desired/accepted residential population densities and desired/accepted land utilization percentages).
NUMBERED DOTS: the Cali case studies.

● PUBLIC: streets, walkways, open spaces. Areas within an urban layout used for pedestrian and vehicular circulation. The land has minimum physical controls and maximum public responsability in initial purchase, development and maintenance.
The CURVE shows: optimum area percentages for streets, walkways, and open spaces. (20-30 %, based upon case studies in Latin America and in the U.S.A.) The percentage of street and walkway areas varies slightly with density.

● SEMI-PUBLIC: open spaces. Areas within an urban layout used for supporting facilities and services. (Open spaces-playgrounds are the only supporting areas considered since the land utilization percentages are only based upon a small sector area) The land has partial or complete physical controls and public/user responsability in development and maintenance.
The CURVE shows: optimum area percentages for open spaces. (3-31%, based upon case studies in Latin America and in U.S.A.) The percentage of open spaces varies considerably with density.

● PRIVATE: dwellings, lots. Areas within an urban layout used for residential and commercial use. The land has maximum physical controls and owner/tenant/user responsability in development and maintenance.
The CURVE shows: optimum area pecentages for dwellings and lots. (The range of optimum percentages of land for Public areas is 20-30% with 3-31% for Semi-Public areas; therefore, the remaining 77-39% of land is for private use)



LAYOUT EFFICIENCY

The urban LAYOUT is the physical configuration determined by the combination of networks of circulation and areas served. Networks of circulation (highways, streets, walkways) define the lines of distribution/collection of the utilities and services, and are publicly owned land. Areas served (lots, blocks) are usually privately owned land. The urban layout is a major economic determinant in the provision of utilities and services and their maintenance and operation.

The efficiency/effectiveness of a network is the ratio of the length of the network to the area(s) served:

$$EFFICIENCY\ OF\ NETWORK = \frac{network\ length}{area(s)\ served} = R\text{-}VALUE$$

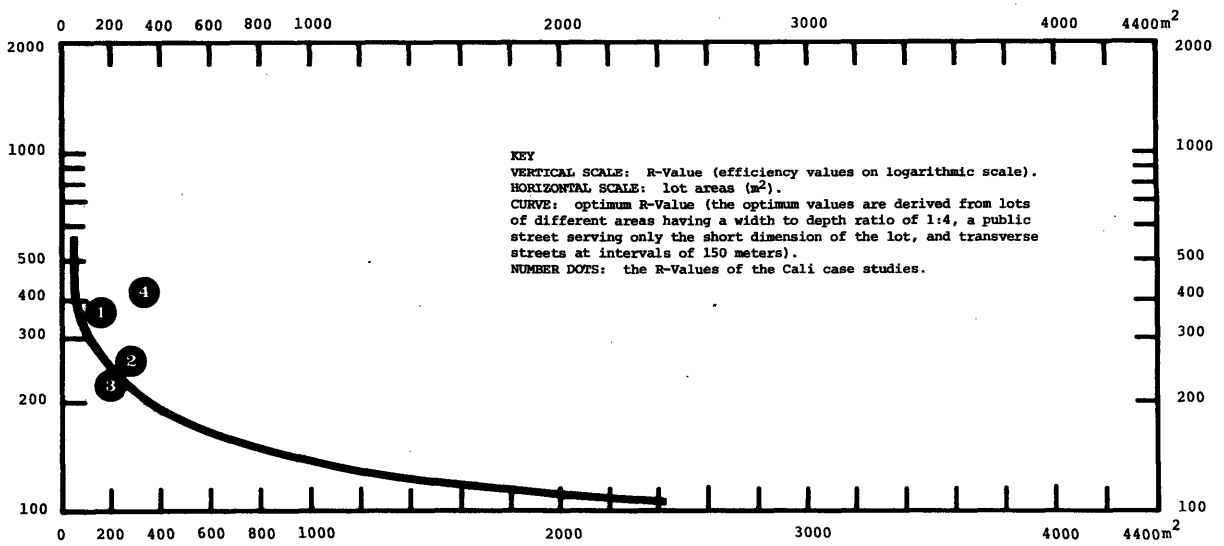
The R-Value varies inversely to the network efficiency; a smaller R indicates a higher efficiency and vice versa. The layouts of the case studies have been evaluated in terms of network efficiency and are shown in the graph below. For further information on the R-Value see: "A Method for the Evaluation of Urban Layouts", INDUSTRIAL FORUM, Volume 3, Number 2, Montreal, December, 1971.

The comments below relate to the land utilization percentages of the Cali case studies. These cases do not satisfy all three optimum land utilization requirements (public, semi-public, private) but are only close to the optimum range in one or two of the cases. It may be observed from the graph that only one of the cases is within reasonable density ranges.

● PUBLIC: Cases above curve (1A, 2, 3, 4) have a high percentage of land devoted to streets and walkways; therefore these cases constitute a great burden to the municipal government in terms of land, construction, maintenance, and operation. The case below the curve (1) has a smaller percentage of land devoted to streets and walkways. This case is still a burden to the municipal government because it serves areas sparsely populated. Cases near the curve (none) have a reasonable percentage of land devoted to streets and walkways.

● SEMI-PUBLIC: Cases above curve (none) have a higher perecentage of land devoted to open areas of undetermined use. These situations are a burden to the municipal government in terms of landscaping, maintenance, and operation. Cases near the curve (none) have a reasonable percentage of land for open spaces.

● PRIVATE: Cases above and below curve (4, 3) are sparsely populated areas and, therefore, a burden to the municipal government in the provision, maintenance, and operation of utilities and services. Cases below the curve (1A) have a very low percentage of land devoted to lots.



Urban Development Model

In the city of Cali as well as in many cities in Latin America, over population is the greatest problem facing national authorities. In Colombia, population growth has reached 3.2% per year and the housing deficit in the same time period is approximately 9.8%. These figures indicate the gravity of the problem. Cities like Cali are not prepared to absorb this population growth which rated among the highest in Latin America.

The main object of this proposal is:
- To provide a specific framework of related aspects/ determinants for discussion/evaluation/policy decision making.
- To act/serve as a catalyst for the various factors essential to the successful public application of technological resources.

Jairo A. Millan V.

BASIC DATA

The site is approximately 5km northeast of the city center, adjacent to the Barrios Populares, and 6km north of the industrial area.

AREA:
The site has approximately 300 Ha available for residential use. SHAPE: Rectangular shape with boundaries on all sides: railway line to the south connecting the city of Cali to the agricultural center Palmira, the Oriental Highway to the west, and urban development of the north and east.

APPROACHES/ACCESS:
Oriental Highway on the west, Airport Road on the north, and 52nd Street on the east.

UTILITIES:
Existing sewer, electricity, and water lines run parallel to the Oriental Highway and 52nd Street, and a third, future substation of water distribution on "Puerto Mallarino" make feasible the connection of the project to the networks.

TRANSPORTATION:
Bus routes along the Oriental Highway and Airport Road connect the site to the central business district, industrial areas, agricultural centers, and other places of employment.

TOPOGRAPHY:
Flat land without obstructive natural physical features on all sides.

SOIL CONDITION:
The results of soil analysis show the existence of soils of different stratums, compounds of inorganic slimes, and clays of high plasticity with variations in their load capacity. Soil load capacity is sufficient for normal construction practices in Cali and project demands.

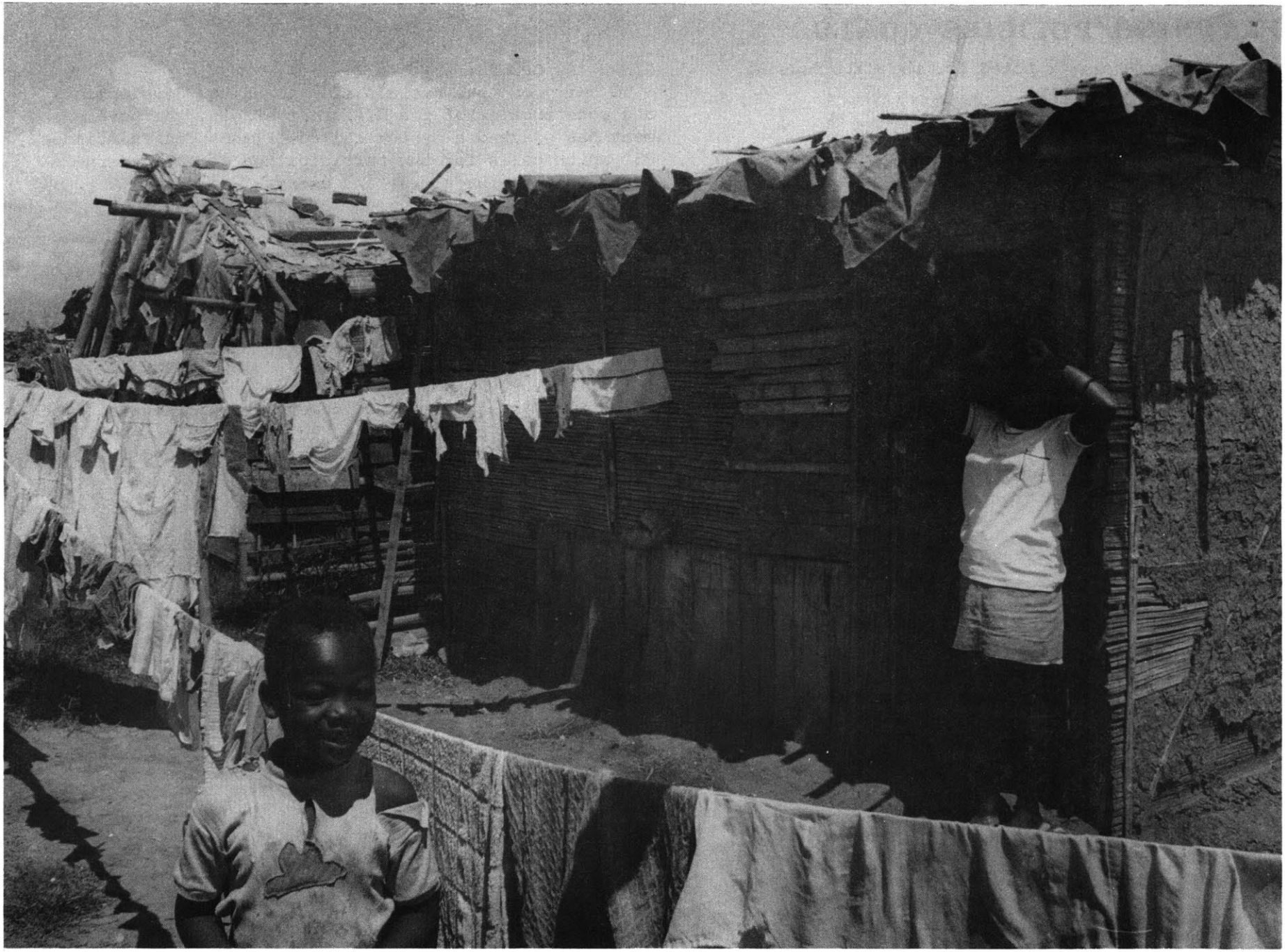
ZONING/RESTRICTION AND REGULATION:
The site is zoned for residential and, with special licenses, commercial use. The coefficient of land exploitation is 1.30. Maximum building height is 18m.

LAND TENURE/LAND COST:
Approximately 40% of the land is owned by the government.
Land cost: Values range from \$5 US/m^2 to \$6 US/m^2 compatible for low cost residential development.

OTHER FACTORS:
Climate: Tropical within ranges of human comfort; good conditions for outdoor activities.
Smoke/ Odors: From industrial area on the north of the site.
Airport: No nuissance problems because location of the Military School of Pilots changed.

PLAZA DE CAICEDO: Point of major commercial and administrative activities in the city center. (previous page)

The three subsequent photographs are representative of the low income housing sectors found within the urban area. The first photograph shows a typical vehicular road converted into a pedestrian road. The second photograph shows the front of some houses in which one can see how the users have set the dwelling within the lot. Notice the latrine and laundry space. The third photograph shows a typical squatter development.



PLANNING POLICIES GOALS

The policies/goals proposed for the Cali Housing Project are as follows:

PRIMARY USE: DEVELOPMENT OF A RESIDENTIAL COMMUNITY
The primary use of the site will be residential. Residential use implies that the necessary supporting land uses will be included:
- Schools
- Playgrounds
- Institutional requirements
- Commercial facilities and markets

The site will allow the development of a zone of commercial, public facilities and very light industries.

TARGET INCOME GROUPS: PREDOMINANTLY LOW INCOME SECTORS
- The development will aim at a community with predominantly low income groups where the housing demand is critical.

%	GROUPS	ANNUAL INCOME US $
27.5	middle low	960-1440
48	low	480-960
10	very low	240-480

TOTAL 85.5%

INTENSITIES OF LAND USE: MEDIUM DENSITIES
- The densities planned for the site range from 400 to 500 p/Ha.

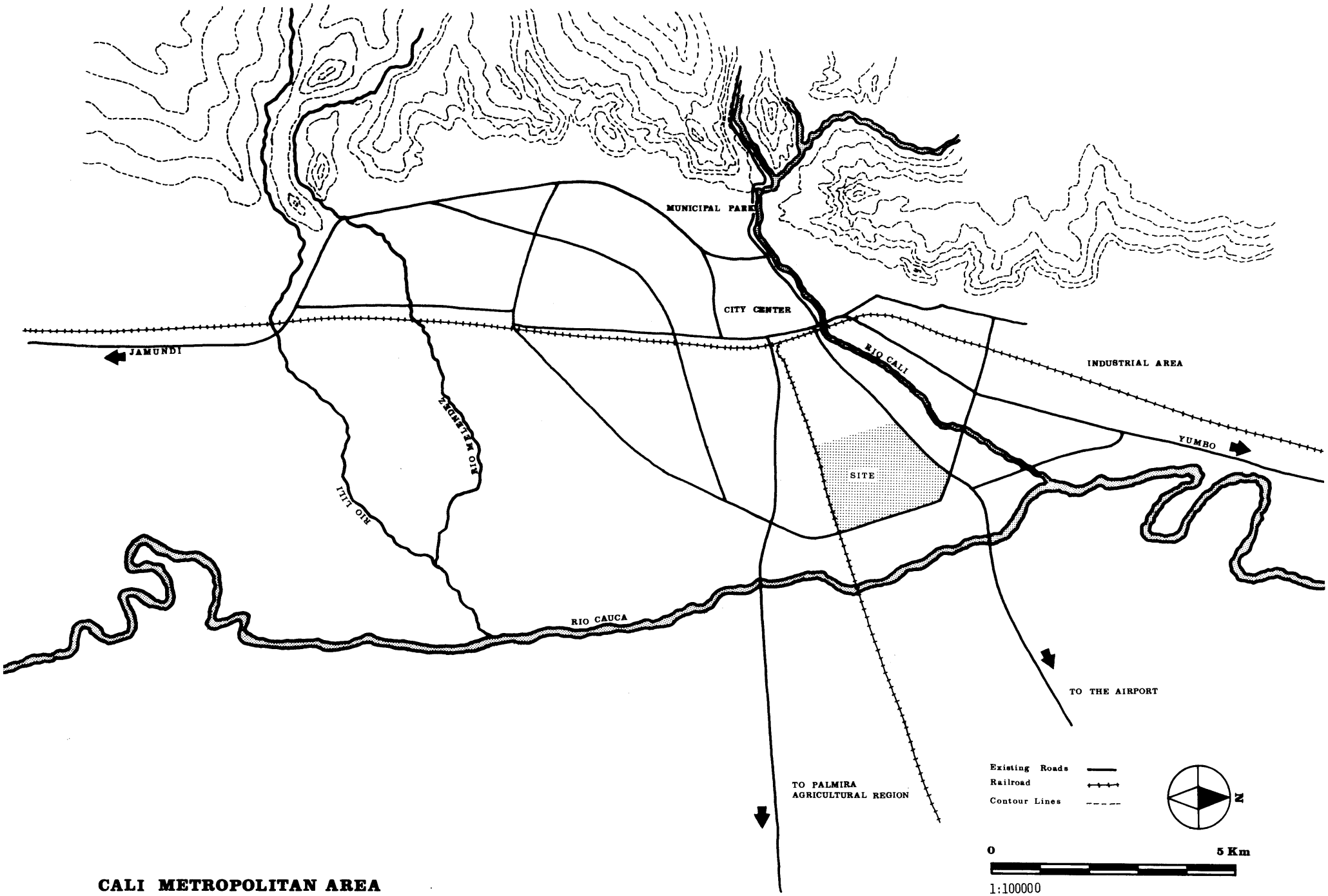
LAND TENURE
- The site will offer primarily ownership properties.
- Walk-up, multistory, and single story development planned.
- Subletting is encouraged in all housing systems.

FINANCING GROUPS:
- To carry out the overall site planning, development, and construction of the different stages, the government has planned a system called "Planes Confinanciados P3" which calls for the participation of the government, private investors, and users.

CIRCULATION:
A clear link between the internal and external circulation in order to obtain an adequate road network is created which at the same time allows optimum residential land use.
- Pedestrian circulation will predominate over vehicles.

UTILITIES:
All utility systems: water, sewer, storm drainage, electricity should be interconnected with the metropolitan networks since they have already been included in future planning.

DEVELOPMENT MODE: INCREMENTAL GROWTH
The site will be developed incrementally according to physical, economic, social and political demands.
- The primary infrastructure networks (water, sewers, electricity, street lighting) will be initially developed.
- The dwelling, community facilities and secondary infrastructure will be incrementally developed. Government programs intend to develop 72 hectares per year according to the general development plan for the city of Cali (1972-1980).



CALI METROPOLITAN AREA

LAND USE PLAN

The primary use of the site is for residential community purposes with supporting commercial and community services. Predominant commercial growth will develop along the main circulation route and on land with higher costs. All community facilities will be placed within walking distances of the residential areas served.

	Ha	%
Gross land within boundaries of site	310	100
AVAILABLE LAND FOR DEVELOPMENT	310	100
PUBLIC LAND		
- Circulation (total length) 23.450m	49	16
- Schools, playgrounds, open areas, recreation, hospital Market, public community facilities	36	15
PRIVATE LAND		
- Residential, commercial, small industries	215	69
	310	100%

The site has a potential population of 120,000 to 150,000 people. At the saturation stage, this figure represents 13% of the present population of Cali.

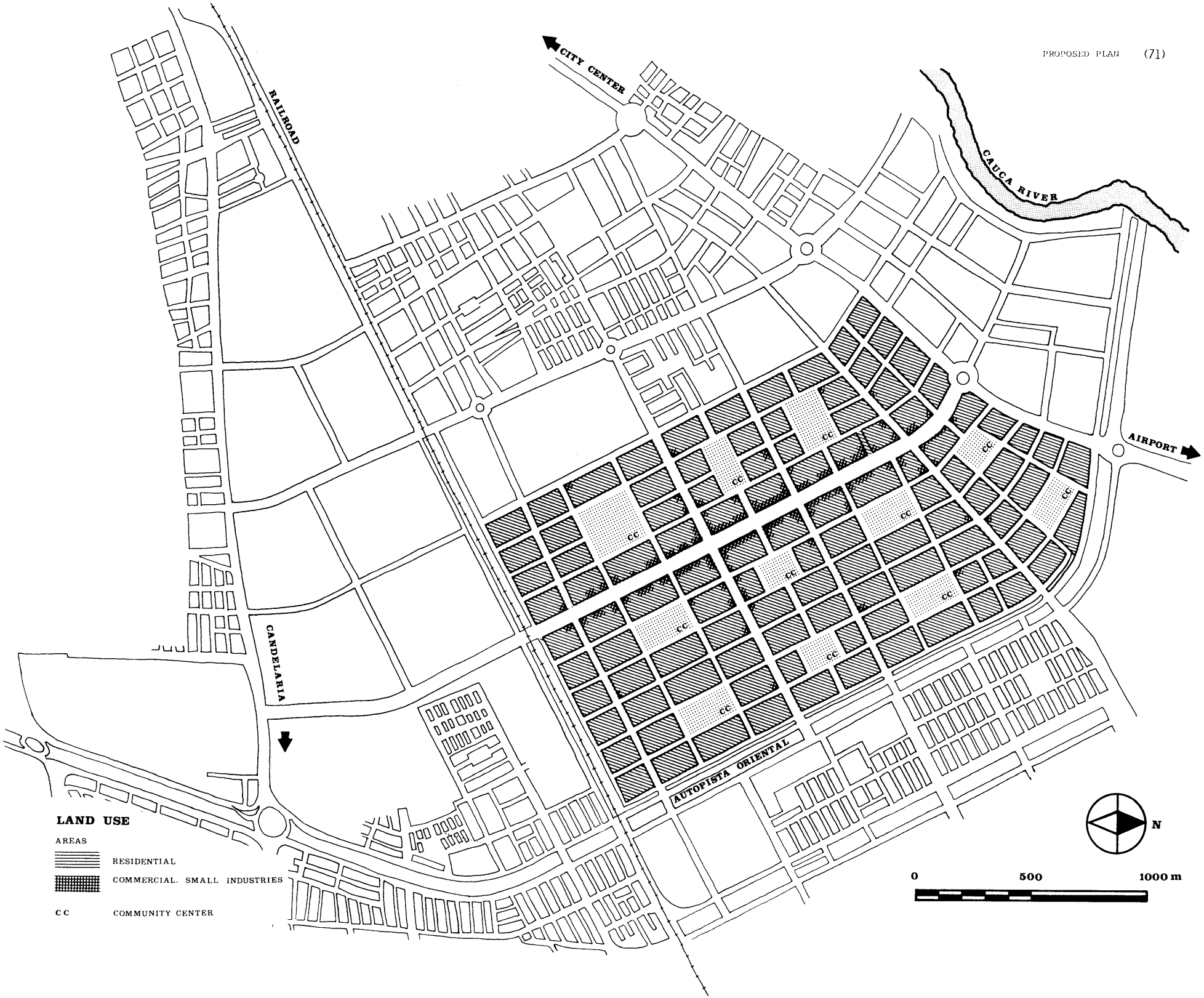
Because the site is a medium-sized town it should be planned not only in terms of community services, but also in terms of the following options:
- Different income groups
- Diversity of choice in land tenure
- Diversity in housing programs
- Public and private developers and funding

The proposed land use plan shows:
OPEN AREAS: Located in the center of the urban units making possible its use with a walking distance of not greater than 100 meters.

SCHOOL FACILITIES: Within the open area. According to the given population, 15 to 20% are children between the ages 7-15. A primary school should be provided for 1,600 pupils at an average of $14m^2$/ pupil (Latin American Standards).

PUBLIC FACILITIES: A social service center must be located in the open area.

RESIDENTIAL AREA: Surrounding the communal area; provided as lots and lot clusters. Along the main street bigger lots are provided for commercial development and light industry. Walk-up apartments are located facing the main streets. Lot clusters have access to activities on the main street via the street entrance and also to the cluster activities in the open area.


CITY CENTER
RAILROAD
CAUCA RIVER
AIRPORT
CANDELARIA
AUTOPISTA ORIENTAL
CC
LAND USE
AREAS
RESIDENTIAL
COMMERCIAL. SMALL INDUSTRIES
CC COMMUNITY CENTER
N
0
500
1000 m

CIRCULATION PLAN

Pedestrian and vehicular circulation will be mixed in the public streets with pedestrian traffic predominating. The land in the circulation grid, utilized for the provision of ways of movement for both pedestrian and vehicular access, is considered to be under public ownership. The circulation layout is based upon:

a) Connection of the urban unit with its immediate neighborhood and at the same time with the city center through the main streets.

b) It has been determined that the layout that best serves the site is a main through street running parallel to the Oriental Highway and Street 52 with local transverse streets.

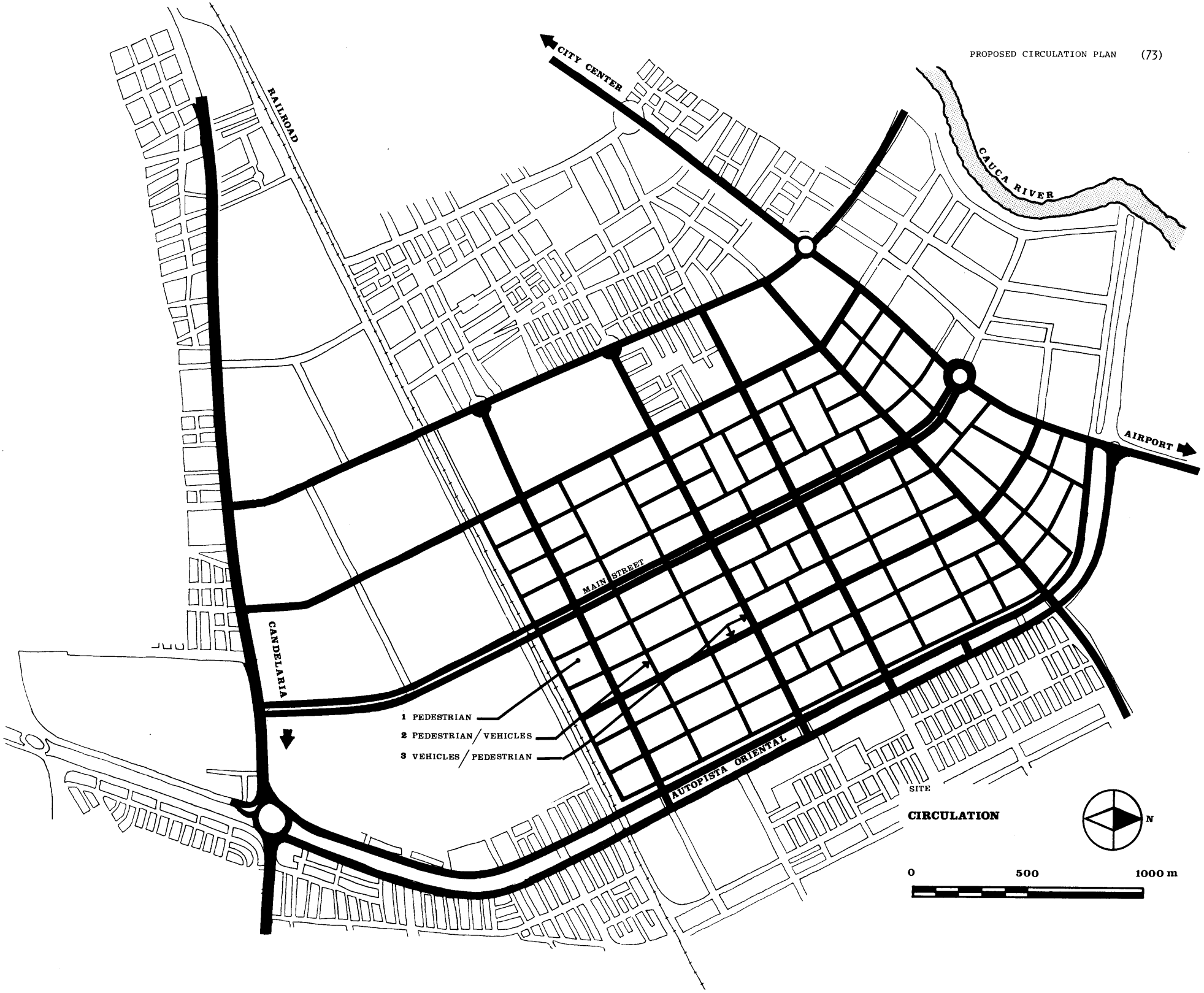
c) Minimization of utilities networks for the public sector.

CIRCULATION MODES: The following circulation conditions are considered in the plan:

1 PEDESTRIAN ONLY: exclusive use by pedestrians. Vehicles admitted only in emergencies.

2 PEDESTRIAN AND VEHICLES MIXED: Pedestrian predominates over vehicular use. Control of traffic frequency, character, and speed are established mainly by the street layout and use. Example: local streets around community area.

3 VEHICLES AND PEDESTRIAN MIXED: Vehicles predominate but do not control the circulation. Controls are established for the protection of pedestrians: crosswalks, traffic lights, rails, etc. Example: main commercial streets, transverse connectors.


CITY CENTER
RAILROAD
CAUCA RIVER
AIRPORT
MAIN STREET
CANDELARIA
1 PEDESTRIAN
2 PEDESTRIAN / VEHICLES
3 VEHICLES / PEDESTRIAN
AUTOPISTA ORIENTAL
SITE
CIRCULATION
N
0
500
1000 m

DEVELOPMENT PLAN

The initial development of the project should consider the following prerequisites:
- Easiest/direct access to the urban unit should be considered as a first priority.
- Convenient pedestrian access to public transportation or extension of public transportation is expected to be enforced.
- Immediate utilization of existing/available infrastructure and services in order to minimize costs.

INITIAL DEVELOPMENT should include the following:

Land Use: residential, commercial, small industries, public facilities, open areas.
Circulation: pedestrian walkways, local streets, main streets.
Infrastructure: primary network.

SUBSEQUENT DEVELOPMENT:
The layout of the model allows:
- Natural progressive growth of land uses, circulation, and infrastructure.
- Consistency maintained between land use/density/commercial potential and intensity of circulation/activities.
- Facilitates compact development.

The direction of growth may be anticipated as shown by arrows in accompanying plan.

DWELLING OPTIONS

The following housing options are derived from government proposals, demand in the Cali metropolitan area, and studies of existing housing systems (case studies).

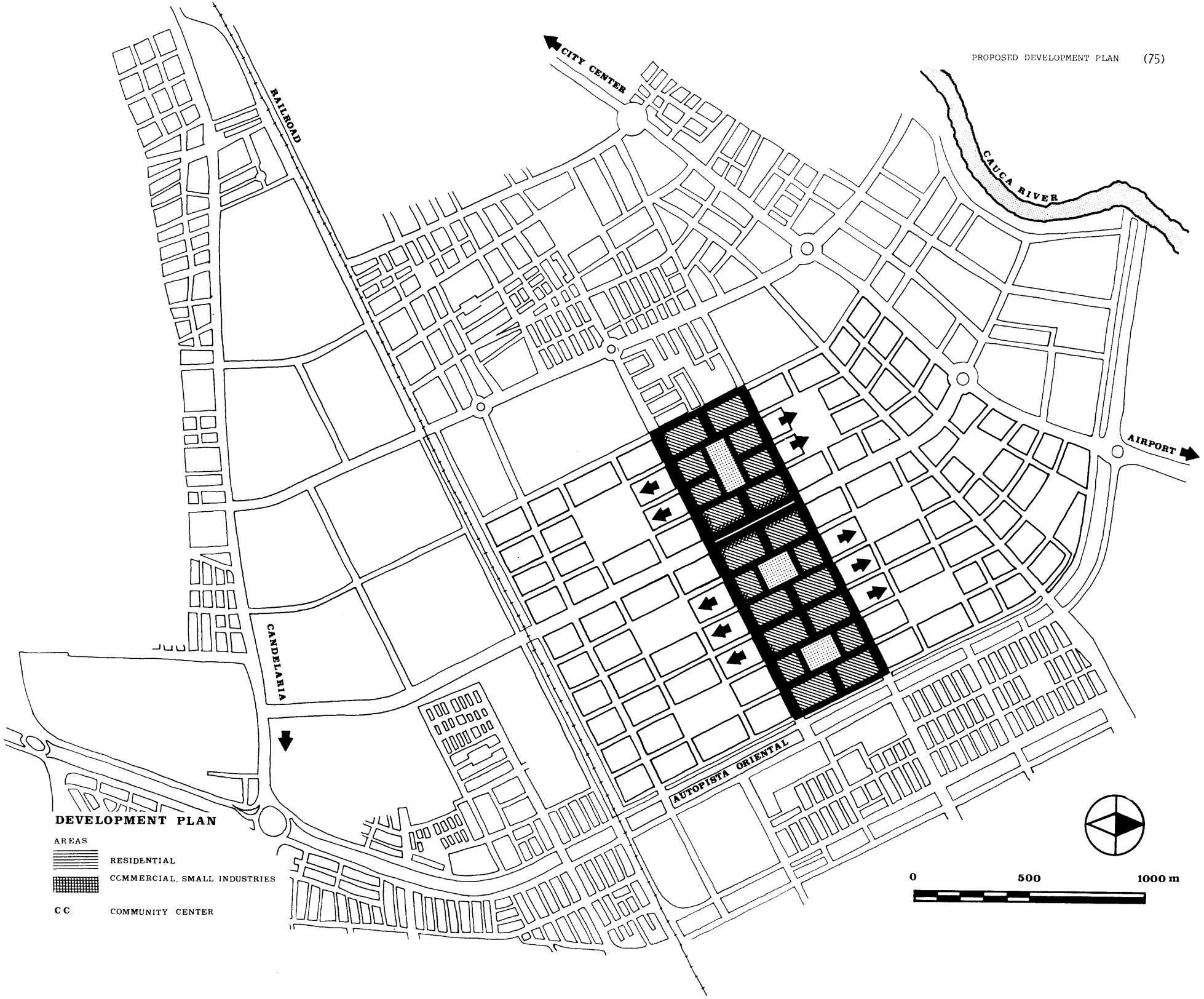
● LOTS
Include the lot and water and electrical connections.
Tenure: Ownership. User will develop/build dwelling.
Developed: User
Lot area: 90m^2

● HOUSES (CORE HOUSES)
Units include lot with facilities; toilet, shower, and minimum cooking facilities.
Tenure: Ownership. User may expand dwelling.
Developed: Users/government and private sector
Lot area: 90 - 120m^2

● HOUSES (ROW HOUSES)
Units include lot with toilet, shower, kitchen, and room.
Tenure: Ownership
Developed: User/government/private
Lot area: 120 - 160m^2

● WALK-UP APARTMENTS
Units include lot with toilet, shower, kitchen, and 1-2 rooms.
Tenure: Units offered to users for ownership and rental. Users may expand the dwelling. Units are along main commercial streets.
Developed: Popular/government/private
Area: 85 - 120m^2

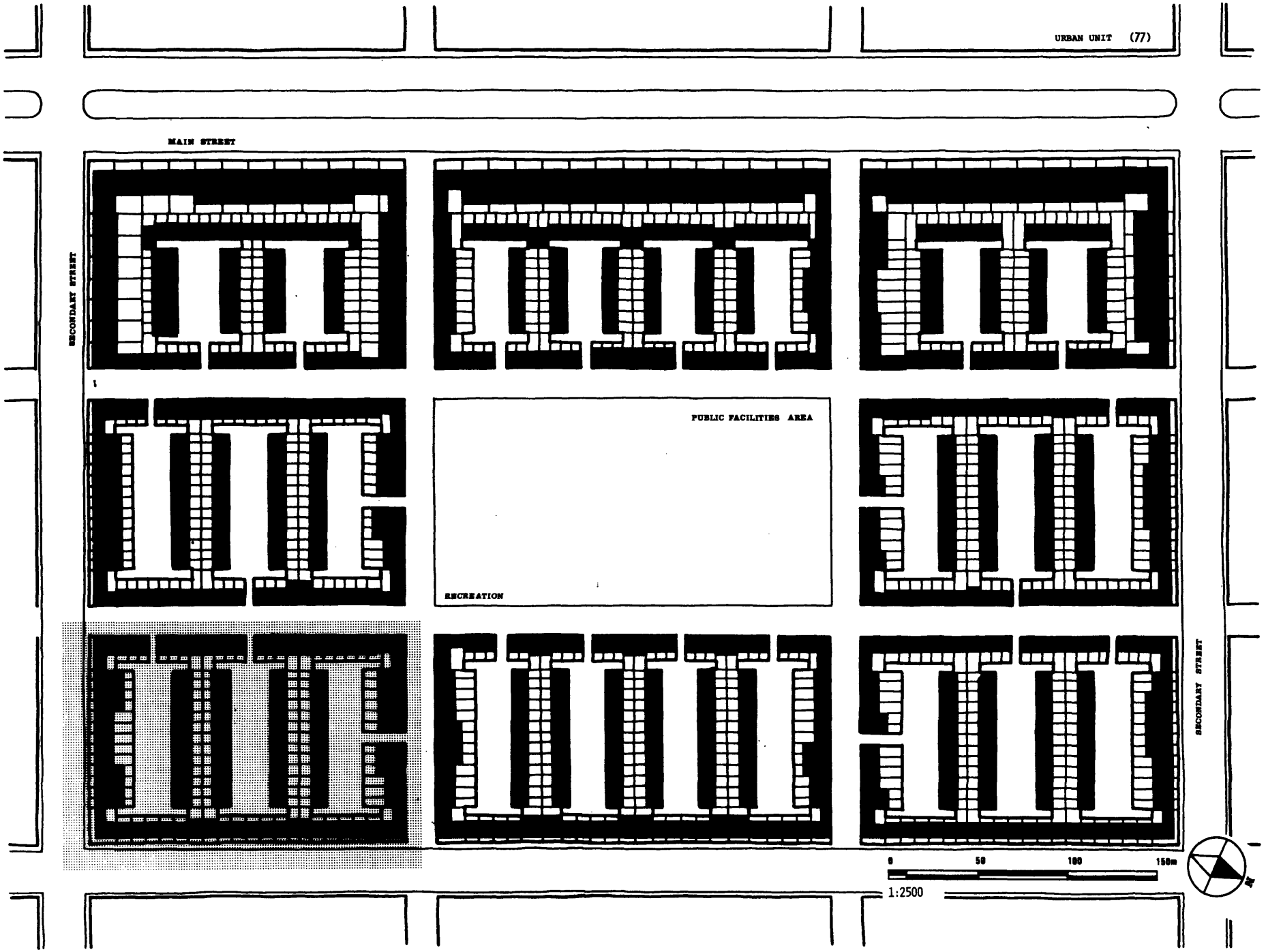
● SHOP DWELLING UNITS
Units will occupy medium/large individual lots with direct access to public streets. Units include the lot for or within the shop dwelling. They are provided with utilities (water, sewerage, circulation, storm drainage).
Tenure: Users offered ownership/lease/rental
Developed: Users/government and private sector


CITY CENTER
RAILROAD
CAUCA RIVER
AIRPORT
CANDELARIA
AUTOPISTA ORIENTAL
DEVELOPMENT PLAN
AREAS
RESIDENTIAL
CCMMERCIAL, SMALL INDUSTRIES
CC
COMMUNITY CENTER
0
500
1000 m

NEIGHBORHOOD LAYOUT

The proposed layout of cluster blocks will create physical environments that provide a sense of community, facilitate incremental growth to take advantage of rising land values, and allow flexibility in development. It is important to point out that the aim to create a community is based upon the understanding that a community is: 1) a set of people with mutual communication and 2) basically dependent on face-to-face contact among its members. The people have to learn how to direct and control communal interaction. The data and ideas from the communal layouts should be recorded and stored for use in urban areas as alternative solutions to the housing problems.

The unit shown is 600 by 400 meters, based upon an approximate 160 by 100 meter block.
- Open space is within the urban unit; to be used primarily for an elementary school, social services, and recreation.
- The top boundary of the model is a major commercial street, a wide traffic lane which provides a variety of shops, light industry, and heavy pedestrian activity.
- The bottom boundary is a local street, or secondary street.
- The side boundaries are transverse streets, which are local streets, adjacent to other urban units.


URBAN UNIT (77)
MAIN STREET
SECONDARY STREET
PUBLIC FACILITIES AREA
RECREATION
SECONDARY STREET
0
50
100
150m
1:2500

NEIGHBORHOOD LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	1006	23	44
DWELLING UNITS	2130	23	93
PEOPLE	11500	23	500

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	3.8	16
SEMI-PUBLIC (open spaces, schools, community centers)	3.7	16
PRIVATE (dwellings, shops, factories, lots)	12.2	54
SEMI-PRIVATE (cluster courts)	3.3	14
TOTAL	23.0	100

NETWORK EFFICIENCY

R-FACTOR

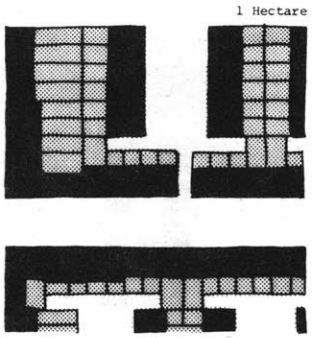
$$\frac{\text{network length (circulation)}}{\text{area served (circulation, lots)}} = \frac{340\text{m}}{2.6}$$

$$= 130\text{m/Ha}$$

AVERAGE LOT AREA

$$\frac{\text{total area (circulation, lots)}}{\text{number of lots}} = 214\text{m}^2$$

LAND UTILIZATION DIAGRAMS



PATTERN

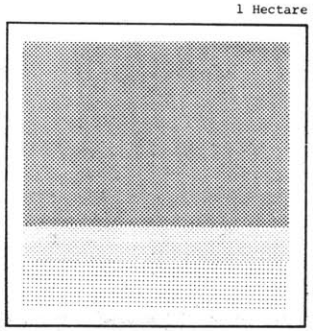
Public: streets/walkways

Semi-Public: playgrounds

Semi-Private: cluster courts

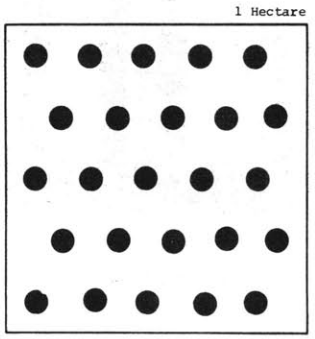
Private: lots

dwellings



PERCENTAGES

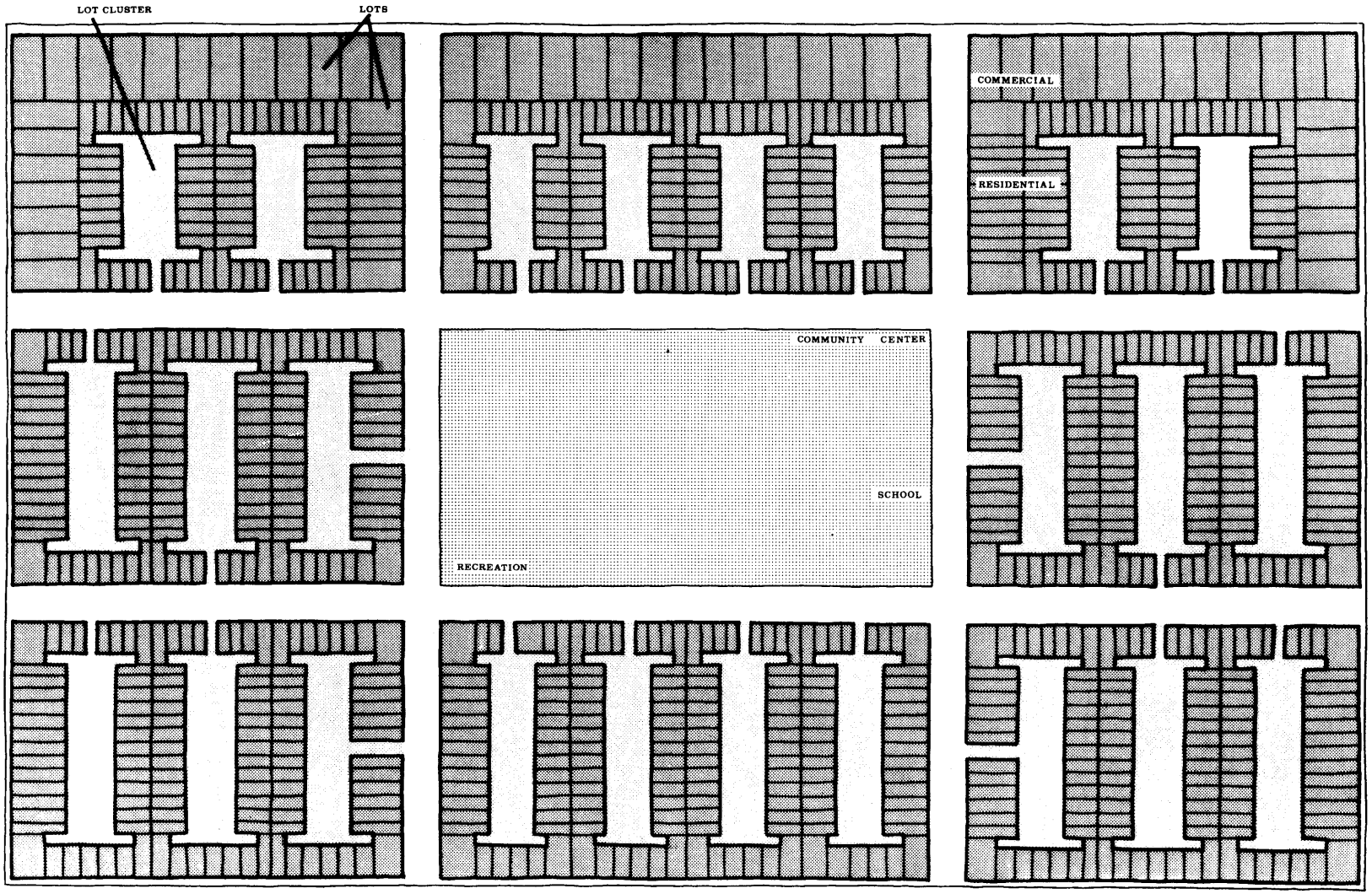
Streets/Walkways 16 %
Playgrounds 16 %
Cluster Courts 14 %
Dwellings/Lots 54 %



DENSITY

Persons/Hectare 500

20 Persons


LOT CLUSTER
LOTS
COMMERCIAL
RESIDENTIAL
COMMUNITY CENTER
SCHOOL
RECREATION
0
50
100
150m
1:2500
N

BLOCKS, LOTS AND LOT CLUSTERS

DEFINITIONS

BLOCK is a portion of land bounded and served by lines of public streets.
LOT is a measured parcel of land having fixed boundaries and access to public circulation.
LOT CLUSTER is a group of lots (owned individually) around a semi-public court (owned in condominium).

The block layout proposed is based on the following policy:

MINIMIZATION OF:
- public ownership of land
- lengths of infrastructure per area served
- government burdens, responsibilities, and services

MAXIMIZATION OF:
- private ownership of land and private responsibility

The blocks contain horizontal condominiums or clusters where lots are grouped around a common court that serves as an access as well as a semi-private open space. This court is owned in common by the occupants who control, shape the use of, and share responsibility for the maintenance of the court.

Different types of lots within the block:

EXTERIOR LOTS: those having access to public streets.

INTERIOR LOTS: those having access only to the semi-private court of the cluster.

EXTERIOR-INTERIOR LOTS: those having access to both the public street and the semi-private court.

The layout proposed permits:

- Flexibility in land uses
Blocks are similar in shape and dimensions while permitting the accommodation of different land uses (residential, residential-commercial, light industry, schools, playgrounds, parks).

- Flexibility in residential densities and housing systems within the same lot structure
Progressive development units, core houses, apartments, expandable houses, other.

- Different types of land tenure
Ownership, rental, sublet.

- Expansion of housing systems
Lot clusters facilitate expansion/transformation of buildings: Horizontal (addition on the ground) and Vertical (addition of floors) expansion without changing lot cluster configuration. Control of minimum spaces in lot cluster courts.

EVALUATION

CRITERIA FOR EVALUATION OF PHYSICAL LAYOUT.

The following criteria in the evaluation of efficiency of physical layouts in the survey are:

- Land Utilization Distribution:
Proportions of public, private, and circulation areas within the layout. This determines maintenance, responsibility, user control, and functional efficiency.

- Layout:
Lot configuration, blocks, and circulation.
This determines the infrastructure network. Network must be clear and within the minimum lengths in order to reduce the cost per person.

- Density:
Number of persons and dwelling units per hectare.
This determines the intensity of use. Low densities mean higher cost of development per person.

- Other related determinants:
Physical, political, and socio-economic.

LAYOUTS: The proposed model layout is compared with different basic types of residential layouts.
Characteristics of the proposed model layout:

- Minimization of public land for circulation, electricity, water, sewage networks, street lights, garbage collection.
- Savings in the construction, maintenance, and operation.
- Lots are grouped around a common court that serves as access as well as semi-private open space. This court is owned in condominium by the dwellers who control and share responsibility for the maintenance.
- Layout permits adequate public open spaces and easier administrative operation.

Characteristics of basic types of residential layouts:

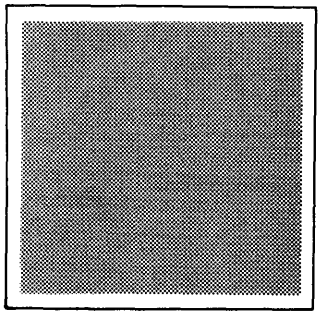
- Waste of public land for circulation (case: Periquillo); electricity, water, sewage networks; street lights; police protection; and garbage collection (case: U.V.P., see opposite page).
- Maintenance and administrative controls are a great responsibility for the city government (cases: Siloe, U.V.P.).
- Unplanned open, public spaces become land with no use and without maintenance (cases: Periquillo and U.V.P.)
- The lot occupants do not have control and responsibility of the public space adjacent to their property and deterioration is typically characteristic of this situation (cases: Siloe, U.V.P.).

Opposite page shows the patterns, percentages, and densities of the different case studies in comparison with the proposed model.

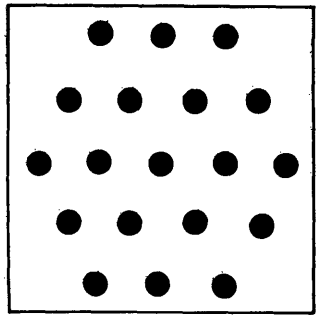
LAND UTILIZATION: PATTERNS, PERCENTAGES, DENSITIES

1 SILOE

Popular: Shanties, Rooms, Houses
% land for public circulation low
% semiprivate land none
% private land high
population density medium
land for public open spaces none
Very poor living conditions. Settlers are unable to pay for utilities and services



PERCENTAGES Streets/Walkways 14%
Playgrounds
Cluster Courts
Dwellings/Lots 86%

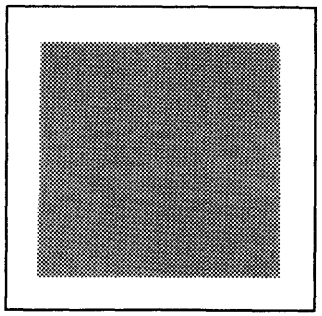


DENSITY Persons/Hectare 372

20 Persons

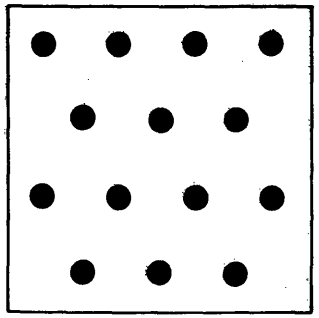
2 U.V.P.

Popular: low income row houses
% land for public circulation medium to high
% semiprivate land none
% private land medium
% land for public open spaces acceptable
population density low
Poor layout with excessive public land; low living conditions.



35%

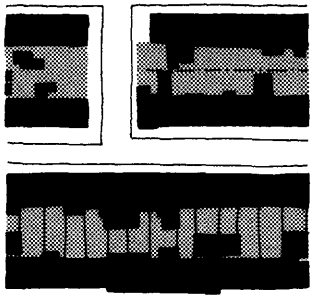
65%

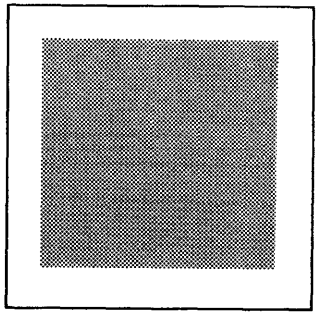


213 P/Ha

3 PERIQUILLO

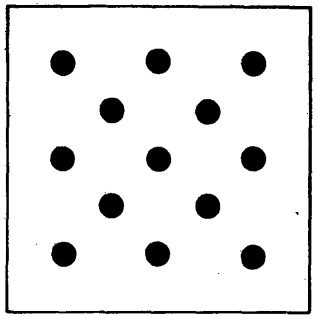
Public low income row houses
% land for public circulation medium to high
% semiprivate land none
% private land medium
% land public open spaces acceptable
population densities low
Layout with excessive public land and undefined open space. Similar cases: 2 and 3.





37%

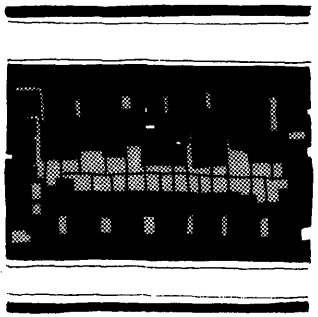
63%

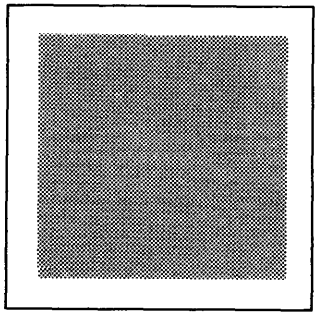


271 P/Ha

4 TRADITIONAL

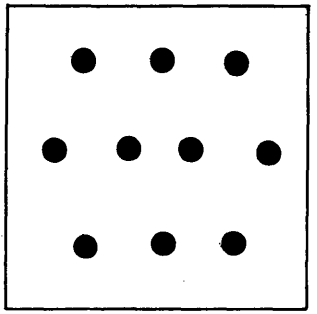
Private middle income row houses
% land for public circualtion medium
% semiprivate land none
% private land high
% land public open spaces very poor
population densities very low
Typical colonial Spanish layout: big lots and low population density.





30%

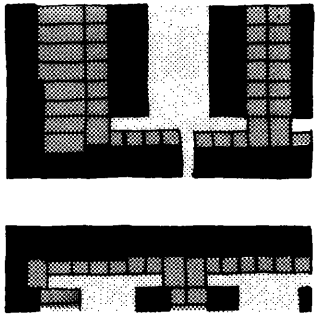
70%

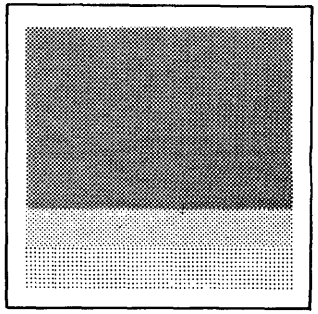


193 P/Ha

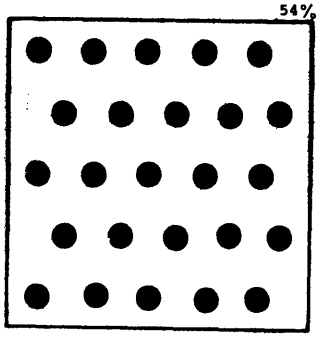
MODEL

Good percentage of land for streets and walkways; defined open spaces and community centers; good percentage of land for private use; desired population density 400 to 500 at saturation.





16%
16%
14%
54%



500

GLOSSARY

Definitions of terms which are generally understood/ accepted and not essential to the presentation/ understanding of the text are included in the Glossary.

(DEFINITIONS TAKEN FROM THE URBAN SETTLEMENT DESIGN FILE)

COMMUNITY: the people living in a particular place or region and ususally linked by common interests; the region itself, any population cluster.

DEVELOPMENT: gradual advance or growth through progressive changes; a developed tract of land.

DWELLING: The general, global designation of a building/shelter in which people live. A dwelling contains one or more 'dwelling units'.

DWELLING CONSTRUCTION TYPES: Primary dwelling construction types and materials are grouped in the following categories:

Shack
- Roof: structure - rods, branches. infill - thatch, mats, flattened tin cans, plastic or canvas sheets, cardboard, scrap wood, and/or mud.
- Walls: structure - rods, branches, poles. infill - thatch, mats, flattened tin cans, plastic or canvas sheets, cardboard, scrap wood, and/or mud.
- Floor: structure/infill - compacted earth.

Mud and Wattle
- Roof: structure - wattle. infill - thatch, flattened tin cans, or corrugated iron sheets.
- Walls: structure - wattle. infill - mud.
- Floor: structure/infill - compacted earth.

Wood
- Roof: structure - wood rafters. infill - thatch, flattened tin cans or corrugated iron sheets.
- Walls: structure - wood frame. infill - rough hewn wood planks.
- Floor: structure/infill - compacted earth, wood joists, flooring.

Masonry/ Wood
- Roof: structure - wood rafters. infill - corrugated iron or asbestos sheets, or terracotta tiles.
- Walls: structure/infill - murram, stone, brick, block or tile masonry without columns.
- Floor: structure/infill - poured concrete slab on/off grade, wood joists, flooring.

Masonry/ Concrete
- Roof: structure/infill - poured reinforced concrete with tar and gravel, or terracotta tiles.
- Walls: structure/infill - murram, stone, brick, block or tile masonry without columns, or with columns for multi-story dwellings.
- Floor: structure/infill - poured concrete slab on/off grade.

Concrete
- Roof: structure/infill - poured or precast reinforced concrete with tar and gravel, or terracotta tiles.
- Walls: structure - poured or precast walls or frame. infill - metal, wood, masonry, plastic.
- Floor: structure/infill - poured or precast concrete slab.

DWELLING BUILDER: Four groups are considered:

Self-Help Built: where the dwelling unit is directly built by the user or occupant.

Artisan Built: where the dwelling unit is totally or partially built by a skilled craftsman hired by the user or occupant; payments can be monetary or an exchange of services.

Small Contractor Built: where the dwelling unit is totally built by a small organization hired by the user, occupant, or developer; 'small' contractor is defined by the scale of operations,financially and materially; the scale being limited to the construction of single dwelling units or sinqle complexes.

Large Contractor Built: where the dwelling unit is totally built by a large organization hired by a developer; 'large' contractor is defined by the scale of operations, financially and materially; the scale reflects a more comprehensive and larger size of operations encompassing the building of large quantities of similar units, or a singularly large complex.

DWELLING DENSITY: The number of dwellings, dwelling units, people or families per unit hectare. Gross density is the density of an overall area (ex. including lots, streets). NET density is the density of selected, discrete portions of an area (ex. including only lots).

DWELLING DEVELOPER: Three sectors are considered in the supply of dwellings:

Popular sector: The marginal sector with limited or no access to the formal financial, administrative, legal, technical, institutions involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Popular sector generally for 'self use' and sometimes for profit.

Public sector: The government or non-profit organizations involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Public sector for service (non-profit or subsidized housing).

Private sector: The individuals, groups or societies who have access to the formal financial, administrative, legal, technical institutions in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Private sector generally for profit.

DWELLING FLOORS: The following number are considered:

One: single story; generally associated with detached, semi-detached and row/group dwelling types.

Two: double story; generally associated with detached, semi-detached and row/group dwelling types.

Three or More: generally associated with walk-up and high-rise dwelling types.

DWELLING GROUP: The context of the dwelling in its immediate surroundings.

DWELLING LOCATION: Three sectors of the urban area considered:

City center: the area located within a walking distance (2.5 km radius) of the commercial center of a city; relatively high residential densities.

Inner ring: the area located between the urban periphery and the city center (2.5 to 5 km radius); relatively lower residential densities.

Periphery: the area located between the rural areas and urban inner ring (5 or more km radius); relatively low residential densities.

DWELLING PHYSICAL STATE: A qualitative evaluation of the physical condition of the dwelling types: room, apartment, house; (the shanty unit is not evaluated).

Bad: generally poor state of structural stability, weather protection and maintenance.

Fair: generally acceptable state of structural stability, weather protection and maintenance with some deviation.

Good: generally acceptable state of structural stability, weather protection and maintenance without deviation.

DWELLING UNIT: A self-contained unit in a dwelling for an individual, a family, or a group.

DWELLING UNIT AREA: The dwelling unit area (m^2) is the built-up, covered area of a dwelling unit.

DWELLING UNIT COST: The initial amount of money paid for the dwelling unit or the present monetary equivalent for replacing the dwelling unit.

DWELLING UNIT TYPE: Four types of dwelling units are considered:

Room: A SINGLE SPACE usually bounded by partitions and specifically used for living; for example, a living room, a dining room, a bedroom, but not a bath/toilet, kitchen, laundry, or storage room. SEVERAL ROOM UNITS are contained in a building/shelter and share the use of the parcel of land on which they are built (open spaces) as well as common facilities (circulation, toilets, kitchens).

Apartment: A MULTIPLE SPACE (room/set of rooms with bath, kitchen, etc.). SEVERAL APARTMENT UNITS are contained in a building and share the use of the parcel of land on which they are built (open spaces) as well as some common facilities (circulation).

House: A MULTIPLE SPACE (room/set of rooms with or without bath, kitchen, etc.). ONE HOUSE UNIT is contained in a building/ shelter and has the private use of the parcel of land on which it is built (open spaces) as well as the facilities available.

Shanty: A SINGLE OR MULTIPLE SPACE (small, crudely built). ONE SHANTY UNIT is contained in a shelter and shares with other shanties the use of the parcel of land on which they are built (open spaces).

DWELLING TYPE: The physical arrangement of the dwelling unit:

Detached: individual dwelling unit, separated from others.

Semi-Detached: two dwelling units sharing a common wall (duplex).

Row/Grouped: dwelling units grouped together linearly or in clusters.

Walk-Up: dwelling units grouped in two to five stories with stairs for vertical circulation.

High-Rise: dwelling units grouped in five or more stories with stairs and lifts for vertical circulation.

DWELLING UTILIZATION: The utilization indicates the type of use with respect to the number of inhabitants/families.

Single: an individual or a family inhabiting a dwelling.

Multiple: a group of individuals or families inhabiting a dwelling.

FINANCING: The process of raising or providing funds.

Self Financed: provided by own funds.

Private/Public Financed: provided by loan.

Public Subsidized: provided by grant or aid.

DWELLING DEVELOPMENT MODE: Two modes are considered:

Incremental: The construction of the dwelling and the development of the local infrastructure to modern standards by stages, often starting with provisional structures and underdeveloped land. This essentially traditional procedure is generally practiced by squatters with de facto security of tenure and an adequate building site.

Instant: The formal development procedure in which all structures and services are completed before occupation.

LAND TENURE: The act, right, manner or term of holding land property. Types are categorized by how land is held and for what period of time. Legal definitions are established to determine the division of property among various owners, or the relationship between owner or occupier, or between creditor and owner; and between private owners and the public, and includes the assessment of taxes on private land rights and the regulation of land use through government control. There are TWO BASIC FORMS of land tenure:

Land Ownership: where the exclusive right of control and possession of a parcel of land is held in freehold.

Land Tenancy: where the temporary holding of mode or holding a parcel of land is of another.

LAND UTILIZATION: A qualification of the land around a dwelling in relation to user, physical controls, and responsibility.

Public: (streets, walkways, open spaces
- User: anyone/unlimited
- Physical controls: minimum
- Responsibility: public sector

Semi-Public: (open spaces, playgrounds, schools)
- User: limited group of people
- Physical controls: partial or complete
- Responsibility: public sector and user

Private: (dwellings, lots)	User: owner or tenant or squatter Physical controls: complete Responsibility: user
Semi-Private: (cluster courts)	User: group of owners and/or tenants Physical controls: partial or complete Responsibility: users

LAND UTILIZATION: PHYSICAL CONTROLS: The physical/legal means or methods of directing, regulating and coordinating the use and maintenance of land by the owners/users.

LAND UTILIZATION: RESPONSIBILITY: The quality/state of being morally/legally responsible for the use and maintenance of land by the owners/users.

METROPOLITAN AREA: "an area in which economic and social life is predominently influenced by a central city, to which it is linked by common interests though not often by common policies. The metropolitan area may have one city or more as well as outlying districts or satellite communities. No physical or legal boundaries mark its borders, but roughly speaking, these are the outer limits of commuting to or from the central city" (Abrams, 1971).

PERCENT RENT/MORTGAGE: The fraction of income allocated for dwelling rental or dwelling mortgage payments; expressed as a percentage of total family income.

PUBLIC TRANSPORTATION: that segment of URBAN TRANSPORTATION which is available to the public without restriction. As public transport, it may also be regulated as to its operation, charges, and profits (Abrams, 1971).

SETTLEMENT: occupation by settlers to establish a residence or colony.

SUBSISTENCE INCOME: Average amount of money required for the purchase of food and fuel for an average family of 5 people to survive

TENURE: Two situations of tenure of the dwelling units and/or the lot/land are considered:
Legal: having formal status derived from law.
Extralegal: not regulated or sanctioned by law.

Four types of tenure are considered:
Rental: where the users pay a fee (daily, weekly, monthly) for the use of the dwelling unit and/or the lot/land.
Lease: where the users pay a fee for long-term use (generally for a year) for a dwelling unit and/or the lot/land from the owner (an individual, a public agency, or a private organization). No cases of lease are shown in Typology.
Ownership: where the users hold in freehold the dwelling unit and/or the lot/land which the unit occupies.
Employer-Provided: where the users are provided a dwelling unit by an employer in exchange for services; i.e., domestic live-in servant. (Only one case is shown in the case studies.)

ABBREVIATIONS

REFERENCE ABBREVIATIONS

N.A.	Not Available
P.G.D.	Plan General De Desarrollo
U.V.P.	Union De Vivienda Popular
I.M.P.	Instituto De Medicina Preventiva
I.C.T.	Instituto De Credito Territorial
U.V.	Universidad Del Valle

QUALITY OF SERVICES,FACILITIES AND UTILITIES
None: When the existence of services,facilities and utilities are unavailable to a locality.
Limited: When the existence of services,facilities and utilities are available to a locality in a limited manner due to proximity.
Adequate: When the existence of services,facilities and utilities are available in/to a locality.

QUALITY OF INFORMATION
The quality of information given in the drawings have been qualified in the following manner:
Tentative: When based upon rough estimation of limited sources.
Approximate: When deducted from different and/or not completely reliable sources.
Accurate: When taken from reliable or actual sources.

EQUIVALENTS

METRIC SYSTEM EQUIVALENTS

Linear Measures		
1 centimeter	= 0.3937	inches
1 meter = 100 centimeters	=39.37	inches
	3.28	feet
1 kilometer = 1000 meters	=3,280.83	feet or
	0.62137	miles
1 inch	=2.54	centimeters
1 foot	=0.3048	meters
1 mile	=1.60935	kilometers
Square Measures		
1 square meter	=1,550	square inches or
	10.7639	squre feet
1 hectare = 10,000 Sq meters	=2.4711	acres
1 square foot	=0.0929	square meters
1 acre	=0.4087	hectares

DOLLAR EQUIVALENTS
All income, cost,and rent/mortgage data have been expressed in terms of the U.S. equivalent;
1 U.S. dollar = 22.8 Colombian Pesos.

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